Journal of FORESTRY

JUNE 1951

SOCIETY OF AMERICAN FORESTERS 1900

Volume 49
Number 6

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VOLUME 49 ● NUMBER 6 JUNE 1951

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The JOURNAL OF FORESTRY, established in 1917, is the official organ of the Society of American Foresters, but the Society assumes no responsibility for the statements and opinions expressed by contributors.

Publication office, 825 Mills Building, 17th Street at Pennsylvania Avenue N. W., Washington 6, D. C. Address all correspondence concerning editorial or business matters to JOURNAL OF FORESTRY, 825 Mills Building, 17th Street at Pennsylvania Avenue N. W., Washington 6, D. C. Published monthly. Subscriptions, $6 per year; single copies, 60 cents. Missing numbers will be replaced without charge provided claim is made within thirty days after date of the following issue.

The editors are not responsible for loss or damage of manuscripts and photographs while in transit or in their possession. All material submitted for publication should be accompanied by return postage.

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Journal of Forestry

Official Organ of the Society of American Foresters

To the Class of 1951

An Editorial

Henry Schmitz
University of Minnesota.

In a few weeks thousands of the best of America's youth will be graduating from the colleges and universities of the nation. Some hundreds of these will be graduates in forestry. All are concerned with the question "What lies ahead for me?"

Predicting even the immediate future is always hazardous. It has never been more hazardous than it is today. Never, perhaps, has there been more confusion and more uncertainty in high as well as in low places. On the other hand, never perhaps have there been more and greater opportunities and more need for young men with well-trained, well-disciplined minds than there are at the present moment.

There are among us cynics who see little opportunity for the youth of today except service in the armed forces. They see only another lost generation. There are, indeed, those despairing souls who have given up hope for the peaceful settlement of the world's problems and tensions.

The moment is perilous! The graduates of the class of 1951 must be prepared physically, morally, and spiritually to meet the stern tasks, realities, and sacrifices that lie ahead. There is no easy solution to the nation's problems. Above all, therefore, the nation needs most, young men, irrespective of their professional interests, who give promise of taking an active and courageous part in the preservation of the best in our American tradition and the enrichment of it.

There probably never was a time when it was sufficient for the educated man merely to be a forester, an engineer, or a physician. If there ever was such a time, it has long since passed. Today, as Robert M. Hutchins, former chancellor of the University of Chicago, has so aptly said, the educated man must show the fruits of his education "by showing that he can and will think for himself. He must keep his head, and use it. He must never push other people around, nor acquiesce when he sees it done. He must struggle to retain the perspective and the sense of proportion that his studies have given him, and decline to be carried away by waves of hysteria. He must be prepared to pay the penalty of unpopularity. He must hold fast to his faith in freedom. He must insist that freedom is the chief glory of mankind, and to repress it is in effect to repress the human spirit."

The foresters of the graduating class of 1951, as other college graduates, have heavy responsibilities and deep commitments. They also have wide opportunities.

In spite of the large graduating classes of 1948, 1949, and 1950, the employment situation now appears to be far more favorable than could have been forecast even a few months ago. Not only are these job opportunities numerous—they are also varied.

As has been the case for several years, the number of openings for permanent positions in federal agencies will be limited. There are no signs on the horizon that the situation will change in the immediate future. Industrial and state forestry jobs will, no doubt, more than compensate for this loss and will provide employment for the largest number of June graduates.

The growth of industrial forestry from its humble beginnings just a few years ago to its present size has been one of the outstanding developments in forestry in the United States. Industrial forestry, now employing well over 4,000 foresters, offers ambitious young men opportunities undreamed of only a few years ago.

Opportunities for employment with state, county, and public agencies other than federal rival the expanding opportunities in industrial forestry. The June graduate of 1951 may find employment with state agencies at salaries which are constantly being improved and which now equal those paid by the federal government and by industry, although range in salaries may not be so great. The growth of state forestry also is a most significant development of the past two decades.

Fully to comprehend these developments one need only compare the employment opportunities of the graduates of 1926 with those open to the graduate of today. Then the new graduate had little chance of professional employment unless he had successfully passed the Junior Forester examination and had placed well up on the register. Industrial and state forestry had little to offer. To be sure, the number of graduates then was small, but in proportion to the number of jobs available, classes were larger than in 1951.

In the post World War II period enrollment in forestry rose rapidly. The number of job opportunities fortunately also increased in total number and variety. The situation has improved steadily, especially during the past year. It is perhaps correct to state, therefore, that never before have the job opportunities open to well-trained foresters been so good or so varied.

A considerable number of the

members of the graduating class of 1951 undoubtedly will receive reserve commissions in the armed forces as a result of participating in one of the several ROTC programs. The immediate future of these men seems to be reasonably well assured. They will serve their country as an officer in the armed forces and will enter their profession some time in the future with added experience and prestige. Other graduates who have not had previous military service and who have not taken advantage of the opportunities the ROTC programs offered will undoubtedly also have a somewhat similar experience but under somewhat less favorable conditions.

You foresters of the class of 1951 will soon be leaving the college campus. You will go to new communities and new environments in civil or military assignments. Your former teachers expect much of you because you are the most highly selected and the best trained class of foresters yet turned out by American forestry schools despite anything the "oldsters" may think or say.

Promise yourselves to be your best—personally and professionally. Promise yourselves never to forget that you have responsibilities to your community, the state, and the nation that equal, if they do not transcend in these perilous times, your professional duties. Promise yourselves never to forget the high purposes of your profession. Promise yourselves ever to be free, intelligent, responsible American citizens — than which there is no higher privilege.

As you leave the college campus and enter your world, let that world be as broad as human experience, as long as time, and as lofty as the highest human aspirations. In a world of such dimensions, and only in a world of such dimensions, can the free soul live with purpose, with hope, and with confidence.

❦❦❦

This is the fourth in a series of guest editorials, which will appear in the JOURNAL *during the year, by well-known personalities in the natural resource conservation movement. Dr. Schmitz, a former editor of the* JOURNAL OF FORESTRY *and past president of the Society of American Foresters, is dean of the College of Agriculture, Forestry, Home Economics, and Veterinary Medicine at the University of Minnesota.*

THREE MILLION SLASH PINE SEEDLINGS were made available free of charge by International Paper Company to landowners in Bay, Calhoun, Jackson, Holmes, Walton, and Washington counties, Florida during the 1950-51 planting season. These counties are adjacent to the company's Panama City Mill.

Agencies cooperating in the cooperative program are the Agricultural Extension Service, Florida Forest Service, Soil Conservation Service, and International Paper Company. All applications for these seedlings are handled by the county agents who recommend tree planting to farmers. The Soil Conservation Service, in making farm work plans, also recommends the planting of pine seedlings on sub-marginal farm land. The seedlings are grown at the Munson Nursery of the Florida Forest Service and are trucked to the county seat of each county where participating agencies help in the distribution of the trees to landowners.

Prior to the planting season, demonstrations were given in each county showing proper handling and planting techniques. In addition, a tag attached to each bundle of seedlings illustrated the correct care of seedlings upon arrival.

Participating in this seedling program is a part of Interntional Paper Company's Conservation program as a member of the Southern Pulpwood Conservation Association. Plans are being made to increase the number of trees available for the 1951-52 planting season.

The photograph shows: *left to right.*—Tom Bingham, Panama City landowner; H. M. Roller, Jr., conservation forester, International Paper Company; and J. E. Moore, district forester, Florida Forest Service. *On truck.*—Albert Von Axelson, Florida Forest Service.

The Role of Forests and Foresters in Our National Economy[1]

Lyle F. Watts
Chief, U. S. Forest Service,
Washington, D. C.

THE ROLE of forests and foresters in our national economy — that is a mighty big topic. It is a big subject because the place of forestry in our economy is big, and is destined to be bigger, much bigger. The breadth of its role is indicated by the diversity of the topics considered at this conference. We have heard of the forests in their manifold roles as suppliers of wood, as habitat for wildlife, and as protectors of soil and water resources. We can consider the forests also as employers of men, and as the foundation of large and important industries. We can consider them as havens of relaxation and recreation for ourselves and our fellow men.

One has only to contemplate the fact that one-third of the land area of this great country is forest land to get the idea of bigness. The crops of the forests are measured in billions of board feet — and even though the word has become commonplace in the day's headlines, a billion still represents a whale of a lot. Forest crops also are measured in millions of tons of pulp and paper products, in millions of gallons of turpentine and millions of gallons of syrup. The product of forest ranges can be reckoned in millions of pounds of meat. The forest crop again can be measured in acre-feet of irrigation water, or in kilowatt-hours of power, or in millions of man-days of recreation.

We who are foresters know better than most how valuable and important a resource the forest is. But even we may find it difficult to realize just how fundamental and how widespread are the benefits of the forests, how much they mean to the total economy, and how much the forests and their products enter directly or indirectly into practically every phase of present-day living. Their role will grow. The present level of the domestic economy, with a total national income of over 200 millions a year, our great industrial development, the current public debt, the present standard of living, the increasing population — all these things spell a need for growth. And the forests must contribute to that growth. It is no exaggeration to say that we can maintain our standard of living and our position of industrial and economic strength only if we build up the productivity of our soils and forests. A permanently prosperous industry and an expanded economy demand an abundance of forest resources. Our future progress, our future strength and security, our national welfare will depend in part — in very substantial part — on how we handle our forests.

World Situation Strains Economy

I am not going to go into detail about the present international situation and the reasons why it has become our country's responsibility, whether we like it or not, to exercise world leadership in the struggle to uphold democracy, freedom, and human decency against totalitarian aggression. We all accept that fact. It is clear that we must keep ourselves strong. That means a strong determination to meet our responsibility of leadership in a free world, and the material power to back up that determination. It means improving and expanding the production of all the materials which are the measure of a nation's wealth and strength. It means maintaining and improving our natural resources, including the resources of the forests.

The world situation today is putting critical strains upon our economy. It demands an all-out effort to enhance the productivity and sustained output of our forests. We need increasing supplies of forest products now; and for a strong, healthy future we shall need even more abundant forest resources.

We have the land to meet these needs. We must not gloss over the fact that those lands are not now doing the job. Our forest land is not making half the contribution it can in the long pull if we put it fully to work.

Fifty Years of Progress

This year, as we stand at the half-century mark in American forestry, it is appropriate to take a look backward and see how far we have come and how we got there. And it is also a fitting time to take a look at the way ahead— to try to peek into the book of the future and see how forests and foresters will fit into the resource picture and into our national economy in the years ahead.

In the fifty years since the beginnings of forestry in this country we have made much progress. Fifty years ago you could have counted on your fingers the men who could call themselves professional foresters. Today several thousand professionally trained men are working in the forestry field. More than thirty colleges and universities now offer forestry curricula, and last year these schools turned out some sixteen hundred forestry graduates.

Fifty years ago, forestry in this country was mostly just an idea in the heads of a few forward-looking men. Today it is practice actually applied, to a greater or less degree, on many million acres of forest land. A real start toward American forestry has been made. Management techniques have been worked out for many of our American forest types. We have accumulated a lot of forestry know-how.

[1]Paper given at the annual meeting, Society of American Foresters, Washington, D. C., December 16, 1950.

Losing Ground Slowly

We have indeed made progress. Yet the net result of all this is the paradox of progress in forestry practice at the same time that the forest resource situation is worsening. We are, of course, losing ground more slowly than we otherwise would. But we are still losing ground so far as the over-all condition of forest resources is concerned. Nationally our forests are operating in the red.

Locally, some startling trends are being shown by the Forest Survey. The timber resources of the State of South Carolina were surveyed in 1936. A re-survey was completed recently in this state, to bring the information up to date and to indicate the trends. In the 11 years between the two surveys the total area of South Carolina's commercial forest land had increased 11 percent, largely through reversion of one-time cultivated farm land. But in spite of this increase in forest land, the total cubic foot volume of the timber growing stock had decreased 5 percent. The total volume of saw timber had decreased by 10 percent. Pine saw timber decreased 12 percent. Saw timber stands were found on only 43 percent of the state's forest land. Over large areas, the valuable pine growth had given way to scrub oak and other low value hardwoods. Eighteen percent of the total timber volume in the state was in cull trees of no prospective value.

Similarly, a re-survey in Florida completed in 1949 showed that the total volume of timber in sound live trees had declined 9 percent in 13 years. The volume of saw timber had dropped 17 percent. Hardwood types increased sharply in this period, while pine types decreased 14 percent.

Similar trends were revealed by the survey in Mississippi.

Seventy-six percent of all our commercial forest land is east of the Great Plains. Yet this area contains only 35 percent of our saw timber volume. All this area has only about as much saw timber as the 6 percent of our commercial forest land located in western Oregon and Washington. East of the Great Plains, the average saw timber stand per acre is only a little over 1,600 board feet. The growing stock is insufficient even as a basis for the present rate of cutting.

We may not all agree on every detail of such figures nor on just how we should interpret them. But no matter how we read the statistics, we cannot deny plain observable facts. You don't even need to be a trained forester to recognize a general deterioration of timber stands over large areas. You can travel mile after mile through so-called commercial forest areas and not find enough good saw timber to keep a fair-sized mill running 24 hours. You can see a growing scarcity of good timber reflected in the poorer grade of material now mostly available at the lumber yards, or in the price you will have to pay for it.

The plain fact is that our supply of good quality, readily accessible merchantable standing timber is getting scarcer. The supply of all-important saw timber is steadily shrinking. We have allowed our timber growing stock to decline throughout much of the East to a point where it cannot much longer sustain even present production levels, and present production levels are much too low for the look ahead. Even in the West some localities are feeling a pinch. Competition for the good timber still available has forced stumpage prices to figures that we would have considered fantastic a few years ago.

Grazing, Wildlife, Recreation

I have been talking of the forest resource situation mainly in terms of timber supply, but forest grazing, wildlife, recreation, and other forest values also are important. The role of the forest as a protector and conservator of water resources is undoubtedly the most important of all.

In the western range country you can observe range deterioration on the ground, and you can see it over wide areas. You can see it in the encroachment of sagebrush or mesquite, in the replacement of perennial grasses by annuals, in the lower density of plant growth and higher proportion of bare dusty ground, in the greater number of acres it takes to support a cow.

Evidence of watershed deterioration can be seen in rivers that now run muddy most or all of the time. It can be seen in the sediment accumulating in stream channels and reservoirs. It can be seen in dried-up springs and wells.

These things are not matters of statistical interpretation, not just the opinions of some theorists in the conservation field. They are observable facts. They can be seen on the ground — not just here and there, but over vast portions of our country. They are visual evidence that we haven't even stopped the downward trend of our forest resources, let alone head aggressively to achieve the abundance that the years ahead call for.

So we have a job to do, and a big one, if our forests are to be brought to and maintained in vigor and healthfulness and productivity. We have a job to do if our forest industries are to be provided permanently with abundant supplies of raw materials.

The Forester's Obligation

Now, if anybody has an obligation to try to make our forests meet the requirements of this country for forest products and services, it is the forester. That is our business; that is what we are professionally trained for. If our country is allowed to drift into a status of chronic timber scarcity, if our forest lands fail to do their full part in supporting the national economy, then, it seems to me, our forestry profession will have failed in its professional duty.

We should plan to grow timber in abundance. We should plan for a liberal use of timber by a growing population in an expanding economy. Unless we are to expect a stagnating economy, a static America, our goal can be no less.

We have the land to grow all the timber we are likely to need. We have 460 million acres capable of

growing merchantable timber. The potential productivity of this vast area should be enough not only to fill domestic needs generously on a sustaining basis, but to provide a backlog for security and some surplus for export to a world that is undersupplied.

We have the know-how for an aggressive start. Forestry knowledge has advanced to the point where we now know how to get several times the growth per acre that we have been gtting on many forest sites. We know how to make many new products from wood . . . and we are progressing fast in that exciting field. We are beginning to understand the possibilities of intensive utilization and greater integration of forest industries. On forest ranges we know much more than we apply as to conservative stocking and other range management practices. We are learning how to improve the habitat for various species of wildlife. We are learning how to manage watersheds to reduce erosive run-off and to increase usable water yields.

Knowledge is already ahead of application, and research and experience are constantly improving and expanding our knowledge, so that eventually we shall be able to do all these things even better, more easily and at less cost.

The Second Half Century

Now, what does all this mean for the years ahead — the second half century? I have no sensational new ideas to suggest — no one-shot cure-alls for all our ills. But I do want to repeat a few thoughts upon which I have strong convictions.

In my judgment, we must see to it that such functions of the forest as range production, recreation, wildlife production, and watershed protection are brought to a high degree of performance and fully integrated with each other and with timber production.

We need greatly expanded research to point the way to making the one-third of our land that is forest land contribute in maximum degree to an expanding economy for our country. Wood and its component parts are amazing in their diversity of uses. The products of the forest are of astounding variety — ranging from great structural timbers to a host of chemical derivatives — even livestock feed and industrial alcohol. There are vast opportunities for further expansion of the usefulness and values of the forests.

We must put our commercial forests to work as rapidly and as fully as we can. In the long look ahead, I see no need for fear that we will produce too abundantly. Past history does not point to any such conclusion here or elsewhere.

Finally, how do we do it? My own answer is what I have so often referred to as a three-point program for forestry: First, every proper public aid to encourage and facilitate private forestry; second, expansion of public forest ownership wherever the public interest requires it, and intensification of management on public forest lands; and third, public controls of forest practices on private lands.

Do I see some eyebrows rise at mention of that last startling thought? Well, I think most of you are long since agreed as to the need for public controls. That is why forest practice laws have been passed in Washington, Oregon, California, Maryland, Mississippi, New York, and half a dozen other states.

I think most of those laws are too weak to do the job. And I think most of you think so too.

But in the long look ahead you all know full well that real control of forest practices will be exercised in this country. It is naive to think that economic conditions which create a favorable atmosphere for profitable forestry will *per se* lead to nation-wide forestry. The same conditions that make forestry look good to some owners also induce liquidation by a great many others.

I think that public control of forest practices is both inevitable and good. It is inevitable because the public interest will require it. It is good because it will help to keep America economically sound and strong.

I am optimistic — indeed, I am enthusiastic — about the future of forestry. If we look ahead with vision and optimism, the profession has no need to worry. It too will expand. The type of forest management I visualize will require very many well-trained technical foresters.

We have the land, and we have the know-how to make and keep our forests permanently and abundantly productive. The opportunity is ours for vast accomplishment.

The responsibility also is ours. We foresters know better than most people what needs to be done. We must therefore provide the leadership necessary to get these things done.

The forestry profession began in this country with a tiny band of crusaders. They had to sell their services to people who had never even heard of such a thing as forestry. They had to plant the seeds of a forest movement. They had to fight for an ideal.

The need for a crusading type of forestry is by no means ended. Forestry still must fight its way. Too few people are yet aware of what forestry means. Fewer still are convinced of its value or necessity. We still need crusaders just as we did fifty years ago. The more people come to realize the importance and necessity of forestry, the greater will be the opportunities for foresters, the richer the rewards, both materially and spiritually, and the greater the accomplishments of our profession.

Forestry, to me, is more than just a job, more than just another way of making a living. It is an opportunity to do something worthwhile. Forestry, public or private, offers a means — and a mighty good means, at that — for making a contribution to human welfare. Few people, indeed, have as good an opportunity as has the forester to serve usefully his fellow men.

Some Factors Related to the Growth of Longleaf Pine in the Atlantic Coastal Plain[1]

Charles W. Ralston
School of Forestry, University of Florida, Gainesville.

A BASIC PROBLEM confronting administrators of forest properties is that of evaluating the productive capacity of lands assigned to timber production.

The usual system of site quality determination involving the measurement of standing timber provides the required data if the area under consideration is stocked with stands of the desired species which are sufficiently mature to permit application of the method.

Many forest transactions, however, include the acquisition of considerable acreages of non-forested land or areas occupied by stands of reproduction which are not suitable for direct measurement of site quality. Prior knowledge of the potential yields of these lands is essential to the efficient allocation of funds for initial purchases and for subsequent investments in silvicultural and management operations.

It is evident that this knowledge must be derived from measurable aspects of the environment which are related to the rate of growth of the vegetation, yet independent of the actual presence of vegetation at the time of estimation. The soil itself is a logical source of this information, since the degree of discrimination sought is ordinarily within climatic and topographic classes, and since it is reasonable to assume that local variations in soil affect the rate of vegetational growth.

From a qualitative viewpoint, foresters have frequently noted the low level of productivity associated with extremely arid soil conditions and the occurrence of high yields on deep, moist, well drained sites, but the application of quantitative techniques to express these observations has been rather limited. Recent work by Coile *(2)* has demonstrated that the site index of loblolly and shortleaf pines in the Piedmont region of the Carolinas can be satisfactorily estimated from field examinations of the thickness of the surface soil and the physical properties of the subsoil. This study also provided the stimulus for further investigations of the relationships between soils and the growth of pine species in the Atlantic Coastal Plain. The results of these investigations applicable to the estimation of site quality for longleaf pine are presented in the following discussion.

Climate and Growing Season

The area considered in this study includes the Coastal Plain regions of North Carolina, South Carolina, Georgia, and northern Florida. The climatic regime of this zone is of the humid type with an average annual precipitation of 48 inches. Rainfall during the growing season increases from north to south and from west to east. Length of the growing season varies from 210 days in North Carolina to 280 days in southeastern Georgia and northern Florida.

Soils and Topography

The soils of the Coastal Plain are derived from materials washed from the Appalachian highlands and the Piedmont plateau. The zonal group of the region is composed of the red and yellow soils resulting from recent podsolization of ancient laterized sediments. The depositions consist of unconsolidated beds of sand, silt, and clay with local accumulations of marl, peats, and mucks.

Profile development is closely related to variations in surface drainage and the influence of ground water tables. On the basis of surface drainage, which is largely a function of the topographic configuration of the land surface, the soils of the region may be classed as well drained, imperfectly drained, and poorly drained.

The well drained red and yellow soils occur in areas of good surface drainage and are the predominant type on rolling topography throughout the western or upper Coastal Plain. The uniform coloration of subsoil horizons indicates that these types seldom are affected by ground water tables.

The imperfectly drained soils are developed in locations of undulating to flat relief with fair surface drainage. Typically, this group is found in the middle Coastal Plain, but it should be noted that the drainage classes listed are not confined to definite geographic areas since representative examples of each kind occur throughout the Coastal Plain on suitable topographic situations. The imperfectly drained soils are further characterized by some degree of mottling in the lower horizons of the profile due to oxidation, reduction, and hydration reactions produced by water table fluctuations.

The poorly drained soils characteristic of the lower Coastal Plain are found on flat to depressed sites with poor surface drainage. Intense mottlings at shallow depths indicate that these soils are generally influenced by high water tables.

Field Data

Soil and mensurational data were collected on 303 0.2-acre plots of even-aged longleaf pine. Areas were sampled with the object of obtaining representative information on stand and soil conditions within the range of longleaf pine on the Coastal Plain. Stands were rejected if the dominant trees had been removed and if adjacent plots occurred on similar soil types.

Tree measurements consisted of the height measurement of six dominant or codominant specimens, tally of all vegetation larger

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[1]Condensed from a dissertation presented in fulfillment of the requirements for the degree of Doctor of Philosophy in the Graduate School of Arts and Sciences of Duke University.

The research reported here was conducted under the direction of Professors T. S. Coile and F. X. Schumacher and is a part of a larger project on the effect of soil on the site index, growth, and yield of southern pines.

than 6 inches d.b.h., determination of the age of stand, and measurement of turpentined faces.

Soils were identified and described, and samples of each horizon to a depth of 5½ feet were drawn from materials composited from four postholes located in cardinal directions from the plot center, near trees used for height measurements. Eight additional borings were made with a soil auger to measure the thickness of the surface soil and the depth to the most impermeable horizon.

Laboratory Analysis

Subsoil samples were studied to measure quantitatively the physical properties related to soil moisture-holding capacity. Moisture equivalent determinations were performed to approximate the moisture conditions of the soils at field capacity. These values may also be conceived as empirical estimates of the maximum supply of water normally available to plants. Samples of material which had been passed through a 2-millimeter sieve were saturated with water, allowed to drain to remove excess free water, and centrifuged at a force of 1,000 times gravity for 40 minutes. The centrifuged samples were weighed, oven-dried, and reweighed, and the moisture equivalent was expressed as the water loss in percentage of oven-dry weight.

Xylene equivalents were determined in order to investigate the imbibitional water values of the subsoils. This procedure is the same as moisture equivalent measurement, except that xylene is used as the saturating liquid in place of water. The difference between the moisture and xylene equivalents—the imbibitional water value—is correlated with the shrinking and swelling properties of clays. Water, a relatively polar liquid, is adsorbed at the colloidal interfaces of clay particles, while xylene, a hydrocarbon of low polarity, is not significantly adsorbed. Thus, the imbibitional water value is a measure of the magnitude of imbibitional forces.

Mechanical analysis of the "B" horizons supplied the sand, silt, and clay percentages used to assign textural grades to the samples studied.

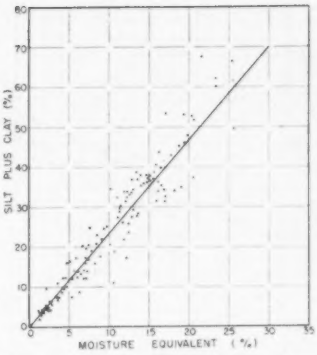

FIG. 1.—The relationship between "silt plus clay" content and the moisture equivalent of the "B" horizon.

Statistical Analysis of Data

Height growth of the dominant trees was used as the basic measure of site quality and the influence of soil and climatic variables on this standard was investigated by regression analysis.

The fundamental growth curve was expressed in the form proposed by Schumacher *(4)*:

$Y = b_o + b_1x_1 + b_2x_2 + \ldots\ldots b_Kx_K$

in which Y is the logarithm of height of the dominant stand in feet, x_1 is the reciprocal of age, $x_2 \ldots\ldots x_K$ represent numerical equivalents of site factors to be tested, and $b_0, b_1, b_2 \ldots\ldots b_K$ are the regression coefficients. Thus, if the equation is solved for $x_1 = 0.02$ —i.e. for age 50—the equation renders the logarithm of site index.

Preliminary tests demonstrated that if moisture equivalent was taken as one of the independent variables, the remaining effect of xylene equivalent was of no significance. Consequently, moisture equivalent was retained, but the difference between moisture and xylene equivalent, the imbibitional water value, was dropped from further consideration.

Early studies also revealed that the "silt plus clay" content of the "B" horizon was significantly related to height growth if this variable was substituted for the moisture equivalent; but since the two measurements are highly correlated, if one factor is used in the growth equation, the additional effect of the other variable is of no consequence. The relationship between these factors, shown graphically in Figure 1, was determined to be $Y = 2.34x$ where Y is the "silt plus clay" percentage of the "B" horizon and x is the moisture equivalent of the "B" horizon.

For subsequent analysis of data, the observations were subdivided into two categories based upon differences in surface drainage since it was suspected that the moisture relations of poorly and imperfectly drained soils were of a different nature than those of the well drained soils. The variables tested for imperfectly and poorly drained soils are as follows:

Age.—The reciprocal of age in years at the 1.0-foot stump level was introduced as the first independent variable (x_1). The square of this age term (x_1^2), was also tested to account for the parabolic effect of age indicated by a plot of the residuals of previous equations.

Moisture equivalent of the subsoil. — This factor was used as a measure of soil moisture-holding capacity.

Depth to mottling.—This variable was decided upon so that a quantitative estimate of the depth to the ground water table could be examined.

Latitudinal range. — The length of the growing season and the amount of summer precipitation increases progressively toward the south through the distribution of longleaf pine. This was considered in the solution of the regression equation as a comparison of the data obtained in the Carolinas with those collected in Georgia and Florida.

Turpentining. — Plots with turpentined trees were compared with non-turpentined areas to determine the effect of this practice on height growth.

Turpentining - latitude interaction.—The possibility of a differential response to turpentining in the two latitude groups was tested in the trial equation.

Stand density. — Longleaf pine occurs in stands that vary in ap-

pearance from open park-like groves to dense forests in which the crowns of adjacent trees touch or overlap each other. The open-grown individuals have thick trunks and spreading crowns, while the forest-grown specimens are characterized by slender clean boles and narrow crowns. To represent this range in stand density, the growing space occupied by the members of a stand was considered as a function of the number and size of the individuals present. For a plot one-fifth acre in size (200 mil-acres) as the standard of normal stocking, the proposition above was stated in the form described by Chisman and Schumacher *(1)*:

$$Y = b_0(n) + b_1(d^2)$$

in which Y is the number of stocked mil-acres, n is the number of individuals, and d^2 is the sum of the squared diameters (d.b.h.) of all n trees. Solving for coefficients b_0 and b_1, the equation may be written:

$$Y = 0.1799\ (n) + 0.0408\ (d^2).$$

The number of stocked mil-acres was computed for each plot by substituting the observed values of n and d^2 in the above equation, and the resulting estimate was used to evaluate the effect of stand density on height growth.

Incorporation of the variables cited above into a single equation for estimating the height growth of 115 plots on imperfectly and poorly drained soils yields:

Equation 1[1]

$$Y = 1.886 - 11.20x_1 + 136.0x_1^2 + 0.00244x_2 + 0.00191x_3 + 0.000384x_4 - 0.0072x_5$$

in which Y is the logarithm of height, and x_1, x_2, x_3, x_4 are respectively the reciprocal of age at 1.0 foot, moisture equivalent in percent, depth to mottling in inches, and stand density in number of stocked mil-acres. The numerical value of x_3 is +1 for stands in the north and −1 for those in the southern portion of the range. The variables listed above were significant at the 1 percent level with the exception of the latitudinal constant which indicated significance at the 5 percent point. The turpentining comparisons were not significant and were eliminated from the estimating equation.

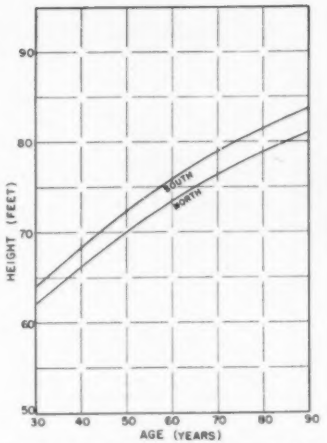

FIG. 2.—Growth curves for longleaf pine on imperfectly and poorly drained soils showing the effect of latitudinal distribution.

The solution of Equation 1 for ages from 30 to 90 years and mean values of the other variables is presented in Figure 2.

The factors examined in the case of 188 plots on well drained soils were the same as those tested for the imperfectly and poorly drained soils with the exception of depth to mottling. This function was eliminated since mottling rarely occurs in well drained profiles. Earlier investigation had shown that the thickness of the surface soil was not significantly related to height growth for the range of data studied. The growth equation for the well drained soils was found to be:

Equation 2[2]

$$Y = 1.915 - 11.11x_1 + 136.0x_1^2 + 0.00118x_2 + 0.000374x_3 - 0.014x_4 - 0.022x_5 + 0.008x_6$$

in which Y, x_1, x_2, and x_3 are as stated in Equation 1; x_3 is the number of stocked mil-acres, x_4 assumes a value of +1 for turpentined areas and −1 for areas of round trees, and x_6 has a value of (1)—taken positively for stands which are turpentined in the north or round in the south, and negatively for areas that are round in the north or turpentined in the south. The variables, x_1^2 and x_6,

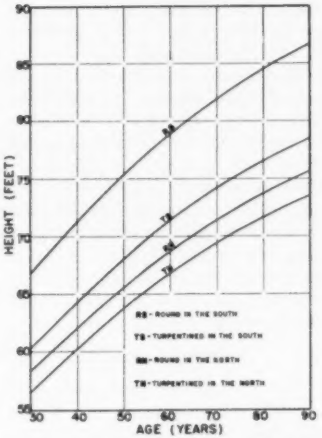

FIG. 3.—Growth curves for longleaf pine on well drained soils showing the effect turpentining and latitudinal distribution.

were significant at the 5 percent confidence level; all other factors were significant at the 1 percent point.

The solution of Equation 2 for ages from 30 to 90 years using average moisture equivalent and stand density values is shown in Figure 3.

Discussion of Results

All categories of soils tested indicated that growth capacity was directly proportional to the moisture equivalent percentage of the subsoil. This hypothesis seems quite plausible if the moisture equivalent is used as an expression of water holding capacity, with the result that subsoils furnishing large amounts of available water are associated with better site quality.

The depth to mottling was used as a measure of the amount of drained growing space for tree roots above poorly aerated substrata. The positive linear correlation of this factor with height growth suggests a favorable response to increased drainage on poorly and imperfectly drained sites.

The reduction in height growth due to turpentining observed by Harper *(3)* was confirmed by this study for turpentined stands on well drained soils. The lack of influence of this factor on imper-

[1]The error of estimate of a single observation is 7.9 percent.

[2]The error of estimate of a single observation is 9.3 percent.

TABLE 1.—MOISTURE EQUIVALENT VALUES OF WELL DRAINED SOILS CLASSIFIED ACCORDING TO TEXTURAL GRADE OF THE SUBSOIL

Group I (Sands)			Group II (Loamy sands)			Group III (Sandy loams)			Group IV (Sandy clay loams and sandy clays)			Group V (All others)		
Series	n	ME	Series	n	ME	Series	n	ME	Series	n	ME	Series	n	ME
Blanton	7	2.3	Norfolk	24	6.6	Norfolk	52	12.4	Norfolk	1	18.4	Red Bay	1	26.0
Norfolk	9	3.2	Ruston	1	7.4	Ruston	17	13.6	Ruston	3	18.4	Shubuta	1	22.6
Red Bay	2	2.6	Red Bay	2	6.1	Red Bay	3	10.9	Marlboro	1	20.6	Orangeburg	2	23.5
St. Lucie	2	1.8	Blanton	3	7.5	Gilead	2	14.8	Tifton	2	18.3	Cuthbert	1	25.4
Wando	2	2.9	Lakewood	2	7.0	Marlboro	6	13.4	Shubuta	3	18.0	Leroy	1	23.6
Lakewood	2	3.4				Tifton	20	13.0	Orangeburg	1	20.4	Greenville	1	33.6
Lakeland	1	2.7				Shubuta	1	11.0	Carnegie	1	20.0	Vaucluse	1	23.1
						Orangeburg	5	11.5	Hoffman	1	20.8	Fairhope	1	24.2
						Carnegie	1	15.5	Fairhope	1	18.8			
						Vaucluse	1	17.0						
						Fairhope	1	13.7						
Average		3.1			6.7			12.8			18.9			25.1

TABLE 2.—MOISTURE EQUIVALENT VALUES OF IMPERFECTLY AND POORLY DRAINED SOILS CLASSIFIED ACCORDING TO TEXTURAL GRADE OF THE SUBSOIL

Group I (Sands)			Group II (Loamy sands)			Group III (Sandy loams)			Group IV (Sandy clay loams and sandy clays)			Group V (All others)		
Series	n	ME	Series	n	ME	Series	n	ME	Series	n	ME	Series	n	ME
Leon	4	3.6	Leon	10	6.3	Leon	2	12.0	Portsmouth	2	17.6	Onslow	1	23.4
St. Johns	8	2.9	St. Johns	5	6.2	St. Johns	1	14.6	Onslow	1	19.1	Lynchburg	1	21.8
Scranton	2	2.5	Scranton	5	6.4	Scranton	8	12.6	Lynchburg	1	18.2	Dunbar	3	23.6
Plummer	1	2.6	Portsmouth	3	7.2	Portsmouth	7	11.2	Dunbar	7	18.9	Coxville	2	23.6
Onslow	1	4.3	Onslow	3	6.4	Onslow	6	11.2	Coxville	2	20.0	Leaf	1	26.4
			Lynchburg	1	8.2	Lynchburg	5	12.3	Susquehanna	1	18.3	Bladen	1	25.7
			Charleston	1	7.8	Dunbar	11	14.7				Eulonia	1	23.5
			Woodston	1	4.4	Plummer	2	9.8						
Average		2.8			6.5			12.6			18.8			23.9

fectly and poorly drained areas is probably ascribable to the paucity of turpentining observations found on these soils.

The comparison of data collected in the north with those observed in the south revealed superior growth conditions in the southern portion of the range. Conceivably, the difference may be attributed to a longer frost-free period of growth and increased precipitation during the growing season in the southern latitudes.

Stand density was significantly correlated with height growth in both equations tested. This factor is ordinarily kept constant in the preparation of growth and yield tables by the careful selection of areas of uniformly excellent stocking. This restriction was not adhered to in sampling stands for this study because the isolation of a single standard of density from the wide range of values exhibited by longleaf stands would have excluded measurement of sparsely stocked stands which probably represent normal density for poorer sites. As a result of examining a wider range of stand density, significant differences were observed between open-grown and forest-grown individuals. The magnitude of height increase associated with an increase in density of 50 percent greater than the mean was 6 feet for stands of average site index 70.

Applications

Although the relationships stated in Equations 1 and 2 may be used directly for site quality estimates, a technique requiring moisture equivalent determination is impractical for field use because the investigator usually does not have the time and equipment required for this procedure. An alternative method assuming only the ability to recognize the textural grade of the subsoil is advocated. The following classes of textural grade of "B" horizon according to "silt plus clay" percentage are proposed:

	Textural grade	Silt plus clay percentage
I	Sands	0–10
II	Loamy sands	10–20
III	Sandy loams	20–40
IV	Sandy clays and sandy clay loams	40–50
V	All other grades	50 plus

This system of grouping makes the relationship between "silt plus clay" content and the moisture equivalent extremely useful. A moisture equivalent value may be assigned in the field by estimating the textural grade of the sub-soil sample and using either the average moisture equivalent figure for this grade listed in Tables 1 and 2, or more accurately, the average value shown for the particular textural grade and soil series under examination.

The moisture equivalent determined may be used directly for site index estimates on well drained soils by interpolation from Figure

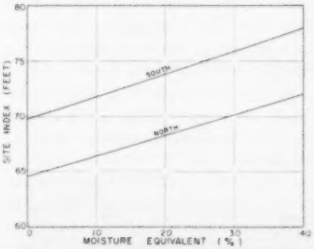

FIG. 4.—Site index of longleaf pine on well drained soils as influenced by moisture equivalent and latitudinal distribution.

4 (curves derived for stands of average density).

For imperfectly and poorly drained soils height estimation requires the additional evaluation of the average depth to mottling. This factor may be fixed by taking several soil auger borings. After the moisture equivalent and the depth to mottling have been assessed, the site index estimate may be read from the curves in Figure 5 (computed for non-turpentined stands of mean density).

The effect of latitudinal distribution may be included in the estimate by adding one foot to the curve values for stands in Georgia and Florida and subtracting one foot from computed site index values for the Carolinas.

Summary

To determine the factors related to site quality, 303 areas of longleaf pine growing in the Atlantic Coastal Plain were examined. The vegetation on each area was tallied,

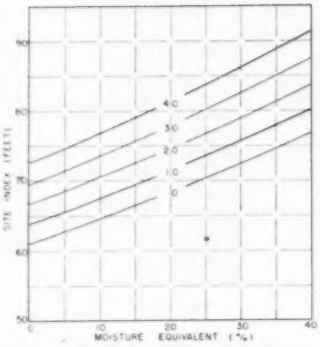

FIG. 5.—Site index of longleaf pine on imperfectly and poorly drained soils as affected by moisture equivalent and depth to mottling.

and height and age of the dominant trees were measured. Soil profiles were described and identified, and samples were drawn from each horizon encountered.

Laboratory analysis provided estimates of the moisture equivalent, xylene equivalent, and "silt plus clay" content of the subsoil.

Statistical analysis of the data by regression methods indicated that age of stand, moisture equivalent of the "B" horizon, depth to mottling, stand density, turpentining, and latitudinal distribution were significantly related to height growth of longleaf pine.

A rapid field method for estimating site quality of Coastal Plain soils for longleaf pine is discussed.

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An Analysis of Head-Sawing Operations at Representative Large Fir Sawmills[1]

The individual elements of the head-sawing operation were studied at 13 sawmills. These elements included loading, setting out, sawing, carriage return, turning, and disposal of the last cant.

The objective of this study was to compare and correlate the efficiency of the different head-sawing operations with the type of deck and carriage equipment and cutting practices followed at the various mills.

The variables encountered precluded easy comparisons. In its final form this paper is a summary of the practices employed at each mill. Where possible, comparisons were made between individual mills in order to emphasize the effect of differences in equipment or methods.

The continuous stop watch method of timing was used to obtain data. This method worked very well in recording the shorter irregular elements but the subsequent laborious compilation of data does not recommend the continuous stop watch technique for further work of this type.

In the mills studied the maximum and minimum times taken for the various elements were as follows:

	Maximum	Minimum
	Minutes	
Load	.19	.05
Set out	.04	.02
Sawing time per line	.19	.05
Carriage return	.12	.05
Turn	.12	.03
Dispose of last cant	.09	.01

Head-sawing time per thousand board feet when compared for logs of certain size classes revealed the expected trend. Small logs and large logs usually require more time than average-sized logs. Head-sawing time varied depending upon remanufacturing equipment. The fastest head-sawing time observed at any mill was 1.45 minutes per thousand board feet for logs 30 inches in diameter, over 24 feet in length. The slowest head-sawing observed was 6.90 minutes per thousand for logs 20 inches in diameter, and 24 feet or less in length. It should be emphasized that head-sawing times are not necessarily a true index of sawing efficiency.

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[1]Abstract of thesis for M.S. degree in Forest Products, Oregon State College, Corvallis, February 1951.

The Georgia Licensing Act for Foresters

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Members of the new Georgia Board of Registration for Foresters being sworn in by Governor Herman E. Talmadge, center, include, from left to right, Harley Langdale, Jr., Guyton DeLoach, B. E. Allen, Jr., A. E. Patterson, and Charles F. Evans.

ON FEBRUARY 21, 1951, the Honorable Herman E. Talmadge, Governor of Georgia, signed into law an act to create a board to be known as the State Board of Registration for Foresters.

By his signature, Governor Talmadge culminated several years of effort by members of the Southeastern Section of the Society of American Foresters to get a licensing bill for foresters passed in at least one of the states under its jurisdiction. More specifically, he culminated ten months of intensive effort by the Georgia Chapter of the Southeastern Section to get the bill passed in Georgia. Since members of the Southeastern Section consider this act a milestone in the profession of forestry in the United States, the following history and interpretation of the act is written to serve as a guide for those who may be called upon to undertake a similar endeavor in other states; and as an interpretation and explanation for those who wish to be licensed under the provisions of the act.

History

For the past several years the Southeastern Section has had a series of Committees on Licensing of Foresters. Membership on these committees has not always been continuous, and in fact, during some years the committee did not function, or even exist. During the period 1948-50, however, a concentrated effort was made by the Section committee to produce a basic licensing bill for foresters which could be used as a model by the state Chapters of Alabama, Florida, and Georgia in producing a licensing bill suitable for each Chapter's particular state.

The basic bill was brought before the spring 1950 meeting of the Georgia Chapter, and was read and discussed. After the discussion the Chapter voted to consider the bill at greater length at its summer meeting. In the interval between meetings, a committee was appointed and instructed to rewrite the bill to fit Georgia conditions, including an investigation of the rewritten bill's constitutionality. After the bill was rewritten and examined by the State Attorney General's Office for constitutionality, it was mailed to each member of the Georgia Chapter for study, ten days preceding the summer meeting.

There was immediate and prolonged debate on the bill as soon as it was brought up for discussion at the meeting. The bill, in the form presented by the committee, was a *compulsory* bill, containing a clause which stated that any person practicing or offering to practice the profession of forestry in Georgia would be required to submit evidence that he was qualified to practice, and must be licensed under the requirements of the bill. The principal objections to the bill were based on this clause, with the contention being that the bill was too strong and too encompassing. The substance of the arguments, as voiced by many foresters at the meeting, can be summed up as follows: Licensing can be of two kinds, (1) it can be of a selfish, self-centered nature, designed to protect the licensed individual from encroachment upon his field of endeavor by the less favored; or (2) it can be of an altruistic, unselfish nature, designed to protect the public which the licensed individual serves. The first type would prohibit the practice of forestry, except by the licensed, and in addition to bordering on unionism, would run head-on into the troubles of defining forestry, forestry practice, exemption of certain phases of forestry practice, and others. The second type would prohibit no one from attempting to earn his living by forestry practice, but would set up standards of quality which could serve as guideposts to the public in their choice of employees.

Acceptance or rejection of the proposed bill never came to a vote at the summer meeting. Instead, the chairman was instructed to appoint a committee to rewrite the bill, incorporating into it as nearly as possible the wishes of the members of the Chapter; and to forward a copy of the revised bill to each Chapter member along with a mail ballot for acceptance or rejection. It was understood that a majority vote for rejection would not kill consideration of a licensing bill, but would only defer further action until a later date. Thus it was apparent, that although the Chapter members wanted a licensing bill for foresters, they wanted a bill upon which the majority could agree.

The committee appointed by the chairman of the Chapter was se-

lected so as to represent as nearly as possible all phases of the profession of forestry in Georgia. Members on the committee were representatives of the Georgia School of Forestry, the Georgia Forestry Commission, the United States Forest Service, the Georgia Forestry Association, the pulp and paper industry, the lumber industry, and two consulting foresters one of whom was a professional forester and the other not. The chairmen of the Southeastern Section and of the Georgia Chapter were *ex-officio* members. After rewriting the bill, and again submitting it to the State Attorney General's Office for examination for constitutionality, it was forwarded with ballots to the Chapter members. The bill as finally written was a *non-compulsory*, or *permissive*, bill which followed the form of item (2), above. The bill was accepted by the Chapter members with a plurality of 3 to 1.

A legislative committee was then appointed, and instructed to get the bill introduced in the forthcoming General Assembly of Georgia, and to follow it through the legislative procedure until passage or rejection. Too much emphasis cannot be placed on the careful selection of a committee of this type. Bills cannot be expected to pass a legislative body just because they are introduced and are worthy. Members of the legislative committee must be thoroughly familiar with legislative procedure, have a wide range of contacts among the legislators, and be able and willing to devote considerable time and effort to obtain the passage of a bill. All these are characteristics few foresters possess. Enough credit can never be given to the legislative committee which obtained the passage of the Georgia bill by the 1951 General Assembly of Georgia.

The Act

An Act to create a board to be known as the State Board of Registration for Foresters; to provide for the qualification of members of said board; to provide for the appointment of the members of said board; to provide for their terms of office; to provide for the organization of said board; to provide for the powers and duties of said board; to provide for the registration of foresters; to provide for the recording of licenses; to provide for the definition of the practice of Forestry; to provide for the revocation of licenses; to provide for fees; to provide for reciprocity; to repeal all conflicting laws; and for other purposes.

BE IT ENACTED BY THE GENERAL ASSEMBLY OF GEORGIA, AND IT IS HEREBY ENACTED BY AUTHORITY OF THE SAME:

I. *General provisions*: Any person using in connection with his name or otherwise assuming, using or advertising any title or description tending to convey the impression that he is a registered forester, shall be licensed as hereinafter provided. Nothing contained in this Act shall be construed as preventing any person, firm, partnership or corporation from practicing forestry; or managing his own timberlands, woodlands or forests, or from operating the removal of any products therefrom, in any manner desired. This Act is for the benefit and protection of the public.

II. *Definitions*: That the term "Registered Forester" as used in this Act shall mean a person, who, by reason of his knowledge of the natural sciences, mathematics, and the principles of forestry, acquired by professional forestry education and/or practical experience, is qualified to engage in forestry practice as hereinafter defined. The "practice of professional forestry" within the meaning and intent of this Act includes any professional service, such as consultation, investigation, evaluation, planning, or responsible supervision of any forestry activities in connection with any public or private lands, wherein the public welfare and property is concerned or involved when such professional service requires the application of forestry principles and data. The term "Board" as used in this Act shall mean the State Board of Registration for Registered Foresters, provided for by this Act.

III. *State Board of Registration for Foresters; appointment of members; terms*: A state Board of Registration for Foresters is hereby created whose duty it shall be to administer the provisions of this Act. The Board shall consist of five foresters, who shall be selected and appointed by the Governor of Georgia from among ten nominees recommended by the Georgia Chapter of the Society of American Foresters and shall have the qualifications required by Paragraph IV of this Act. Every member of the Board shall receive a certificate of his appointment from the Governor and before beginning his term of office shall file with the Secretary of State his written oath of affirmation for the faithful discharge of his official duty. The five members of the initial Board will be appointed for terms of one, two, three, four and five years, respectively. On the expiration of the term of any member of the initial board, the Governor shall in the manner hereinbefore provided appoint for a term of five years a registered forester having the qualifications required by Paragraph IV of this Act to take the place of the member whose term on said Board is expiring. If the Governor fails to make appointment in 90 days after expiration of any term, the Board shall make the necessary appointment. Each member shall hold office until the expiration of the term for which such member is appointed or until a successor shall have been duly appointed and shall have qualified.

IV. *Qualification of members of the Board.* Each member of the Board shall be a citizen of the United States and a resident of Georgia, a Member or Fellow of the Society of American Foresters, and shall have been engaged in the practice of forestry for at least ten years.

V. *Compensation and expenses of Board Members*: Each member of the Board shall receive a nominal sum of ten dollars per diem when actually attending to the work of the Board or of any of its committees and for the time spent in necessary travel and, in addition thereto, shall be reinbursed for all actual traveling, incidental and clerical expenses necessarily incurred in carrying out the provisions of this Act, paid by the State Treasurer out of the General Fund.

VI. *Removal of members of the Board; vacancies*: The Governor may remove any member of the Board for misconduct, incompetency, or neglect of duty. Vacancies in the membership of the Board shall be filled for the unexpired term by appointment only as provided in this Act.

VII. *Organization and meetings of the Board*: The original members of said Board shall be named and appointed by the Governor within 30 days after the passage of this Act.

The Board shall hold a meeting within 30 days after its members are first appointed and thereafter shall hold at least two regular meetings each year. Special meetings shall be held at such time and place as the by-laws of the Board may provide; provided that not more than one meeting may be held during any one calendar month. Notice of all meetings shall be given in such manner as the by-laws may provide. The Board shall elect or appoint annually the following officers: A Chairman and a Vice-Chairman. The Joint Secretary of the State Examining Board shall serve as a Secretary of the Board herein created in the same manner as provided by Section 84-101 and 102 of the Georgia Code. A quorum of the Board shall consist of not less than three voting members.

VIII. *Powers of the Board*: The Board shall have the power to make all by-laws and rules, not inconsistent with the Constitution and laws of this State, which may be reasonably necessary for the proper performance of its duties and the regulations of the proceedings before it. The Board shall adopt and have an official seal. In carrying into effect the provisions of this Act, the Board may, under the hand of its Chairman and the seal of the Board, subpoena witnesses and compel their attendance and may also require them to produce books, papers, documents, etc. in a case involving the revocation of a license or practicing or offering to practice under the title of registered forester without a license. Any member of the Board may administer oaths of affirmation to witnesses appearing before the Board. Such witnesses officially called by the Board shall receive the same compensation and shall be reimbursed for expenses in the same amount as the members of the Board as outlined in Section V of this Act. If any person shall refuse to testify or produce any books, papers, or documents, the Board may present its petition to any Court of competent jurisdiction, setting forth the facts, and thereupon such Court shall, in a proper case, issue its subpoena to such person, requiring his attendance before said Court and there to testify or to produce such books, papers and documents, as may be deemed necessary and pertinent by the Board. Any person failing or refusing to obey the subpoena or order of said Court may be proceeded against in the same manner as for refusal to obey any other subpoena or order of said Court.

IX. *Receipts and Disbursements*: The Secretary of the Joint Examining Board shall receive and account for all monies derived under the provisions of this Act, and shall pay the same monthly to the State Treasurer.

X. *Records and report*: The Board shall keep a record of its proceedings and a register of all applications for registration, which register shall show the name, age, and residence of each applicant; the date of the application; the place of business of such applicant; his educational and other qualifications; whether or not an examination was required; whether the application was rejected; whether a license was granted; the date of the action of the Board; and such other information as may be deemed necessary by the Board. The records of the Board shall be prima facie evidence of the proceedings of the Board set forth therein, and a transcript thereof, duly certified by the Secretary of the Board under seal, shall be admissible in evidence with the same force and effect as if the original were produced. Annually, as of June thirtieth, the Board shall submit to the Governor a report of its transactions of the preceding year.

XI. *Roster of Registered Foresters*: A roster showing the names and places of business of all registered foresters qualified according to the provisions of this Act, shall be prepared by the Secretary of the Joint Examining Boards during the month of March of each year. Copies of this roster shall be mailed to each person so registered, placed on file with the Secretary of State, and furnished to the public upon request.

XII. *General Requirements for Registration*: The following shall be considered as minimum evidence satisfactory to the Board that the applicant is qualified for registration as a registered forester; (1) Graduation from a curriculum in forestry of four years or more in a School or College approved by the Board, and a specific record of an additional two years or more experience in forestry work of a character satisfactory to the Board, and indicating that the applicant is competent to practice forestry; (2) Or successfully passing a written examination designed to show knowledge and skill approximating that obtained through graduation from an approved four-year curriculum in forestry, and a specific record of six years or more of active practice in forestry work of a character satisfactory to the Board, and indicating that the applicant is competent to practice forestry, provided that after five years from the date of enactment of this Act no person shall qualify as a registered forester excepting that person who shall have graduated from a curriculum in forestry of four years or more in a School or College approved by the Board, and who has a specific record of an additional two years or more of experience in forestry work of a character satisfactory to the Board, and indicating that the applicant is competent to practice forestry; (3) Any person, who, on the effective date of this Act, shall have been engaged in the active practice of forestry as defined in Section II of this Act, for at least ten years, shall be eligible for registration as a registered forester without reference to the requirements set forth in (1) and (2) of this Section, provided that he files application for registration with the Board within six months from the effective date of this Act, or the organization of the Board. The Board shall issue licenses only to those applicants who meet the requirements of this Section. Provided that no person shall be eligible for registration as a registered forester who is not of good character and reputation. In considering the qualifications of applicants, forestry teaching in department, school or college of Forestry shall be construed as forestry work. The completion of the Junior year of a curriculum in forestry in a school or college approved by the Board shall be considered as equivalent to two years of active practice; the completion of the Senior year of a curriculum in forestry, without graduation, in a school or college approved by the Board shall be considered as equivalent to three years of active practice.

XIII. *Application and Registration Fees:* Applications for registration shall be made on forms prescribed and furnished by the Board; shall contain statements made under oath, showing the applicant's education and a detailed summary of his technical work, and shall contain not less than five references, of whom three or more shall be foresters having personal or professional knowledge of his forestry experience. The registration fee for a license as a "Registered Forester" shall be ten dollars, five dollars of which shall accompany the application, the remaining five dollars of which to be paid before issuance of license. Should the applicant fail or refuse to remit the said remaining five dollars within thirty days after being notified, in the usual

manner, that the applicant has successfully qualified, the applicant shall forfeit the right to have a license so issued and said applicant may be required to again submit an original application and pay an original fee therefor. Should the Board deny the issuance of a license to any applicant the initial fee deposited shall be retained by the Board as an application fee.

XIV. *Examination*: When written examinations are required, they shall be held at such time and place as the Board shall determine. The methods of procedure shall be prescribed by the Board. A candidate failing on examination may apply for re-examination at the expiration of six months and will be re-examined without payment of additional fee. Subsequent examination will be granted upon payment of a fee to be determined by the Board.

XV. *Licenses*: The Board shall issue a license upon payment of registration fee as provided for in this Act to any applicant, who, in the opinion of the Board, has satisfactorily met all the requirements of this Act. Licenses shall show the full name of the registrant, shall have a serial number and shall be signed by the Chairman of the Board and the Secretary of the Joint Examining Boards under seal of the Board. The issuance of a license by the Board shall be evidence that the person named herein is entitled to all the rights and privileges of a registered forester while the said license remains unrevoked or unexpired. Plans, maps, specifications and reports issued by a registrant shall be endorsed with his name and license number during the life of the registrant's license, but it shall be a misdemeanor for anyone to endorse any documents with said name and license number after the license of the registrant named thereon has expired or has been revoked, unless said license shall have been renewed or reissued. It shall be a misdemeanor for any registered forester to endorse any plan, specification, estimate, or map unless he shall have actually prepared such plan, specification, estimate or map or shall have been in the actual charge of the preparation thereof.

XVI. *Expiration and Renewals*: Licenses shall expire on the last day of the month of December following their issuance of renewal and shall become invalid on that date unless renewed. It shall be the duty of the Secretary of the Joint Examining Boards to notify, at his last registered address, every person registered under this Act, of the date of the expiration of his license and the amount of the fee that shall be required for its renewal for one year; such notice shall be mailed at least one month in advance of the date of the expiration of said license. The Board shall, each year, prior to issuing renewal notices for the ensuing year, fix the annual renewal fee for licenses which fee shall not exceed the sum of five dollars. Renewal of licenses for the following year may be affected at any time during the month of December of the year in which such license has been issued or renewed by the payment of the renewal fee so fixed by the Board. Such licenses may also be renewed during the ensuing ten months by the payment of an additional fee of fifty cents for each month, or fraction thereof that payment of the fixed renewal fee is delayed beyond the month of December. The Board shall make an exception to the foregoing renewal provisions in the case of a person who is in the Armed Services of the United States.

XVII. *Firms, Partnerships, and Corporations*: Registration shall be determined upon a basis of individual personal qualifications. No firm, company, partnership or corporation can be licensed.

XVIII. *Reciprocity*: A person not a resident of and having no established place of business in Georgia, or who has recently become a resident thereof, may use the title of registered forester provided: (1) Such person is legally licensed as a registered forester in his own state or country, and has submitted evidence to the Board that he is so licensed: (2) The State or country in which he is so licensed observes these same rules of reciprocity in regard to persons licensed under the provisions of this Act.

XIX. *Revocations and Re-issuance of Licenses*: The Board shall have the power to revoke the license of any registrant who: Is found guilty by the Board of gross negligence, incompetency, or misconduct in the practice of forestry. The Board is empowered to designate a person or persons to investigate and report to it upon any charges of fraud, deceit, gross negligence, incompetency or other misconduct in connection with any forestry practice against any registrant, as may come to its attention. Such person or persons so designated by the Board shall receive the same compensation and shall be reimbursed for expenses in the same amount as the Board as outlined in Section V of this Act. Any person may prefer charges of fraud, deceit, gross negligence, incompetency or misconduct in connection with any forestry practice, against any registrant. Such charges shall be in writing, shall be sworn to by the person making them and shall be filed with the Secretary of the Joint Examining Boards. All charges, unless dismissed by the Board as unfounded or trivial, shall be heard by the Board within three months after the date on which they shall have been preferred. The time and place for said hearing shall be fixed by the Board, and a copy of the charges, together with a notice of the time and place of the hearing, shall be personally served on, or mailed to the last known address of such registrant, at least thirty days before the date fixed for the hearing. At any hearing, the accused registrant shall have the right to appear personally and by counsel, to cross-examine witnesses appearing against him, and to produce evidence and witnesses in his own defense. If, after such hearing three or more members of the Board vote in favor of finding the accused guilty, the Board shall revoke the license of such registered forester. Any applicant whose license has been revoked as above may apply for a review of the proceedings with reference to such revocation of his license by any Court of competent jurisdiction. The only record to be considered in such appeal shall be the record made before the Board. New evidence must be presented to the Board, in session, before it may be used in court proceedings. The Board, for reasons it may deem sufficient, may reissue a license to any person whose license has been revoked by three or more members of the Board who vote in favor of such reissuance. A new license, to replace any license revoked, lost, destroyed, or mutilated, may be issued, subject to the rules of the Board, and a charge of three dollars made for such issuance.

XX. *Violations and Penalties*: Any person who shall practice or offer to practice the profession of forestry as a registered forester in this State, without being registered or exempted in accordance with the provisions of this Act, or any person who shall use in connection with his name or otherwise assume, use or advertise any title or description tending to convey the impression that he is a registered forester, without being registered or exempted in accordance with the provisions of this Act, or any person

who shall present or attempt to use as his own the license of another, or any person who shall give any false or forged evidence of any kind to the Board or any member thereof in obtaining a license, or any person who shall attempt to use an expired or revoked license, or any person, firm, partnership or corporation who shall violate any of the provisions of this Act, shall be guilty of a misdemeanor, and upon conviction thereof shall be fined not less than one hundred dollars nor more than five hundred dollars for each offense. The Board, or such person or persons as may be designated by the Board to act in its stead, is empowered to prefer charges for any violations of this Act in any Court of competent jurisdiction. It shall be the duty of all duly constituted officers of the law of this State, or any political subdivision thereof, to enforce the provisions of this Act and to prosecute any persons, firms, partnerships, or corporations violating the same. The Attorney General of the State and his Assistants shall act as legal advisor of the Board and render such legal assistance as may be necessary in carrying out the provisions of this Act.

XXI. *Repealing Clause*: That all laws and parts of laws in conflict with the provisions of this Act be and the same are hereby repealed. If any provision of this Act shall be held unconstitutional, the same shall not apply to other provisions hereof.

Interpretation and Comment

Before the mechanics of the act are discussed, there are several points of more than casual interest which should be emphasized.

The basic philosophy of the act is set forth in the last two sentences of Paragraph I, General Provisions, which state: "Nothing contained in this Act shall be construed as preventing any person, firm, partnership or corporation from practicing forestry; or managing his own timberlands, woodlands or forest, or from operating the removal of any products therefrom, in any manner desired. This Act is for the benefit and protection of the public."

The first clause in the first of these sentences, states definitely, if indirectly, that none shall be deprived of the opportunity of attempting to earn his living by the practice of forestry. Thus, the fundamental rights of the individual are protected and emphasized. It is this clause that made the act a permissive one, and without which it is doubtful if the bill would have ever been accepted by a majority of the foresters in Georgia. It is especially interesting to note, however, that there was a strong minority who contended that a permissive act would be a weak act. Counter to this was the feeling that a permissive act was fundamentally stronger than a compulsory act, in that there would be no compulsion of any kind to force a forester, or one doing forestry work, to register other than the compulsion that would come from the public in its desire to employ those whose qualifications had been attested to by registration.

The second clause, in the first of the above sentences, removes from consideration any possible contention that the act is, or ever can be, a stepping stone to public regulation of private forestry practice.

The second sentence, stating that the act is for the benefit and protection of the public, by omission reaffirms the belief that foresters can stand and prosper on their own merits, without legal protection from those who would encroach upon their field of endeavor.

The act contains several "checks and balances," especially in regard to State Board of Registration members who will have the responsibility of administering the act. The board shall consist of five members, appointed from ten nominees who shall be nominated by the Georgia Chapter of the Society of American Foresters. Thus, a balance as to appointees is kept between the Governor and the Chapter. Likewise, although the Governor makes all appointments, the members of the board are appointed for staggered terms of five years each, and the Governor of Georgia is elected for a four-year term and cannot succeed himself. On the other hand, the Governor may remove any member of the board for misconduct, incompetency, or neglect of duty, but vacancies can be filled only from Georgia Chapter nominations.

Mention in the act of the Joint Secretary of the State Examining Boards (in Paragraphs VII, IX, XI, and others) deserves a word of explanation for those not acquainted with the Georgia system in regard to such boards. The Secretary of the State Examining Boards maintains an office and staff for all state examining boards such as pharmacy, engineering, forestry, and others, and serves as secretary for each of the boards. This eliminates undue duplication of effort, and leads to efficiency in administration.

Another item of considerable interest which was originally written into the bill, but which was stricken upon legal advice, was a statement in Paragraph XIX, Revocation and Re-issuance of Licenses, which stated that the board would have the power to revoke the license of any registrant who violated the Code of Ethics of the Society of American Foresters. This, it was advised, would likely be declared unconstitutional under the Georgia Constitution, since it would give to an organization outside the state the power to set standards over which the state had no control. This is an interesting sidelight which might well be considered by those in other states who are contemplating similar bills. The entire Paragraph XIX, as finally written in the bill, was carefully examined by legal counsel to make sure that it would not deprive a registrant, whose license had been revoked, from all rights under "due process of law" and thereby nullify the powers of the board in regard to the maintenance of high standards.

For the same reasons, as mentioned above, it was advised to strike from Paragraph XII, General Requirements for Registration, all references to accreditation of forestry schools by the Society of American Foresters. The bill originally stated that graduation from a curriculum in forestry in a School or College *accredited by the Society of American Foresters or approved by the board*, would be acceptable as partial fulfillment of the requirements for registration. In rewriting the bill, the

committee attempted to overcome the legal objection by giving the board additional power by adding the word "and," so that the statement would read: ". . . accredited by the Society of American Foresters and/or approved by the Board. . . ." This was again declared unsatisfactory by legal counsel, and it was necessary to eliminate all reference to accreditation by the Society of American Foresters, and leave approval of schools or colleges entirely in the hands of the board. Of course the board will undoubtedly be guided in its decisions by the accreditation reports of the Society of American Foresters.

A point of general interest, which might well be studied by those in other states who contemplate a licensing act, is the two-pronged reciprocity clause, Paragraph XVIII, Reciprocity. This paragraph gives to those who have no established place of business in Georgia, or who have recently become residents of Georgia the right to use the title of Registered Forester, in Georgia, providing they are legally licensed in their own state or country, *and the state or country in which they are so licensed observes these same rules or reciprocity in regard to persons licensed under the Georgia Act.* This is reciprocity in the true sense of the term, and will call for close cooperation between the forestry licensing boards of the various states, as they are formed in the future.

Although the act is a permissive one, acceptance of registration carries responsibility. The permissive clause pertains to obtaining a license, and does not specify, nor imply that the licensee may use the term Registered Forester only when he sees fit. In fact in Paragraph XV, Licenses, it definitely states: "Plans, maps, specifications and reports issued by a registrant *shall be* endorsed with his name and license number. . . ." It should also be noted in Paragraph XVII, Firms, Partnerships and Corporations, that registration is to be based upon individual personal qualifications; and that no firm, partnership, nor corporation can be licensed. Thus, licensing shall be on a strictly personal basis and intimate professional qualifications.

As for the qualifications necessary for registration, they are definitely stated in the act, in Paragraph XII. Briefly, without attempting to list the qualifying phrases, there are three categories under which an applicant may qualify: (1) A forestry graduate who has had two or more years of forestry experience; (2) a graduate or non-graduate who has successfully passed a *written* examination prepared by the board, and who has had six or more years of forestry experience; or, (3) any person who, on the effective date of the act has had ten years of forestry experience. This last category was written into the bill to include many of the older men who, although not forestry graduates, are accepted members of the profession of forestry. It should be noted, however, that this commonly termed "grandfather clause" applies only for a term of six months from the effective date of the act, or the organization of the board. Also of importance, is the time limitation placed upon category (2). Following the statement of qualifications in category (2), in the act, it is stated that only category (1) will apply after a period of five years has elapsed from the date of enactment of the act. Considering, therefore, all three categories and the time limits involved, the act becomes progressively stronger as time elapses, finally being restricted to forestry graduates alone.

The act, as passed, can undoubtedly be improved upon. It is, however, the first of its kind in the United States and most likely the forerunner of many to come. It was written in favor of the majority opinion of nearly 300 members of the Georgia Chapter, all of whom had both verbal and written opportunities to discuss the bill, and who then voted its acceptance. From a philosophical viewpoint, the majority opinion in favor of a permissive act versus the strong minority opinion in favor of a compulsory act, will furnish an interesting topic for discussion for years to come.

Log Rules

"There are now in use in the United States and Canada over forty different log rules for board feet. Many of them are admitted to be inaccurate and unfair by their users, who continue to employ them because a satisfactory rule is not known or is not readily available.

"The author has endeavored to collect all the rules in use in the United States and Canada. Many of them are defective, and some are almost absurd. The Scribner, Doyle, and New Hampshire rules have been given in full, the first two being the ones in most common use throughout the country and the last being the best caliper log rule."—From *The Woodsman's Handbook* by Henry Solon Graves, 1903.

The Next Fifty Years In Watershed Management[1]

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WATERSHED MANAGEMENT as a concept is relatively new in American forestry. It implies the management of an area on a watershed basis. It implies the integrated management of all the resources in that area. It is the multiple purpose idea applied to a unit area having one thing in common—the stream.

Foresters of the past half century have had many concepts of management. These have been concerned primarily with single resources—timber, range, wildlife, recreation, and the like. Often, they have believed these to contain many multi-purpose objectives. Indeed, at times they have considered almost any one of these separate and single concepts to embrace all forestry objectives. But as time has passed, it has become increasingly clear that timber managers are little concerned with anything other than timber production, that wildlife managers are concerned with little else but fish and game. Only rarely does one truly find real multi-purpose forest management, but where this is found, the major objective is watershed management.

Today, watershed management is coming to have a definite and specific meaning. It includes many of the connotations associated with conservation: "the wise use of natural resources." Watershed management is the wise use of forest and litter and humus, soil, understory and ground cover, brush and range, fish and animal life, crops and pasture, the land and the water. All the resources and all of man's varied activities within one area are so geared together that the machine operates with everything synchronized and completely meshed.

Forestry has flirted with the watershed concept for a long time. The Weeks Law contained the germ when it stimulated thinking of the forest in terms of water. The Clarke-McNary Act held another. But by and large, much early thinking was on a relatively narrow plane. To many foresters, watershed protection meant little or no use of watershed lands, and protection forestry meant locking up the resources. This was largely a negative approach, and because so, foresters lost sight of the major objectives of an earlier day. Gradually they have become so commercial minded that now the feeling in the profession is that watershed management is ordinary or everyday forestry. Most understand that watershed management means harvesting the forest as usual, logging as the logger does, grazing according to the mode, roads anywhere, and fire control adequate to prevent commercial losses in forest or range.

It is against this back-drop that the Watershed Management Division of the Society has come into being. But what is its objective, what is its task, what should be its aims?

The chief task of this Division is to show the foresters of America that watershed management is positive, not negative; that it is essential, not merely desirable; that multiple purpose management can be achieved, that integration of uses must be the rule. It must show that to achieve real watershed management, the whole land area must be the unit, with the waters as the common theme.

Watershed management embraces all land above a given point on a stream. But as foresters are concerned with the so-called "wild land" phase, we shall have to be content with only a partial segment. Actually we can foresee a time when the Society of American Foresters and the Soil Conservation Society will jointly meet to discuss and plan watershed management. The separation of the forest from the range, the farm woodlot from the pasture, and both from cropland, is an artificial one. Actually the whole subject of land use is involved — forests, fields, farms, cities, industries.

Today we direct our attention mainly to one segment, the forest and related areas. These are the main and immediate responsibility of the forester; although, as citizens interested in the broad regional problems of our country, we have the obligation to make our voices heard whenever watershed treatments may affect man's well being—favorably or unfavorably. Today we are also concerned with administrative and technical management as it affects the water resources.

It is not necessary here to specify the various relations between land and water. It is sufficient to point out that these relations are extremely close; they are known in greater or less degree by many, they are more or less accepted by foresters and others, they are understood by some, they are really appreciated by only a few.

Our appraisal of the future is based simply on the watershed management program needed today. What we of today believe needs to be done, will not only be accomplished but exceeded in fifty years. The conservationists of 1900 probably did not imagine, much less foresee, the progress that forestry would make in the past half century. Today our imagination is probably far too limited to make predictions for the year 2000. The best we can do is to consider the future in the light of present day needs.

Watershed Survey

First among things necessary in the next half century will be watershed surveys. These surveys will appraise conditions as they exist. They will describe for each significant watershed, the status of the land and water resources, and the factors that enter into the problem. They will point out the problems. They will describe what is

[1]Paper delivered at a meeting of the Division of Watershed Management, Society of American Foresters, Washington, D. C. December 15, 1950.

needed in their solution. Because they will be based upon field studies, they will be specific where most past studies have been general. The Copeland report presented one type of picture, the National Resources Planning Board another. Today, the President's Water Resources Policy Commission is outlining problems of a third type. Much more is required, more than is provided in the present so-called watershed flood control surveys, although these do outline some of the major objectives.

Thus, before there can be watershed management, foresters must know what they have to work with. They must know what is on the watershed, its condition, and how it's being used. This information will be required for all types of vegetation, the soil, and the water wherever found.

Of surveys there seems no end. We have topographic surveys, soil surveys, timber surveys, range surveys, and flood control surveys. There are many others. Almost everything associated with the land that has value has been examined. But though these appraisals help define the resources of an area, they do not provide the essential data which will tell us what watershed management is required. It is quite evident that the soil surveyors know little and apparently care nothing for watershed problems. Timber surveyors tell us only a little even of the timber resource, and certainly they are unacquainted with hydrologic conditions. Flood control surveyors generally consider chiefly the flood aspect of the water problem and that in a very general way; underlying causes, social and economic, as well as many physical conditions are neglected. What economics is involved is of the negative rather than a positive sort.

Watershed management requires a survey that can bring together all the important factors—biological, physical, hydrologic, economic, and social. Vegetation will be evaluated not only in respect to its type, volume, and usefulness, but also as to its effective use of water and its degree of soil stabilization. Soil will be viewed not as an isolated component but in relation to the vegetation it supports, and the water it holds and transmits. Water will be measured to determine its disposition on the watershed and its availability for use both on and off the watershed. Economics will help determine how the area got into its present condition and what are the values society may reap. Finally social factors will assist in appraising opportunities for getting the job done.

What will the surveys reveal? They will indicate how much water is available and how much soil. They will reveal where the water goes; whether to plants, to streamflow, to underground reservoirs, or to the air. They will disclose opportunities for hastening flow, decreasing flow, regulating flow, and improving its quality. They will show areas and types which can be used without danger as well as those that should not be used. They will also show the human relations of use and need.

Who will make such surveys? Only men trained in watershed management objectives can do the job. They will have to be well acquainted with the region, familiar with plant and soil indicators of watershed condition and with watershed uses, and understand the physical, social, and economic problems. As for the responsibility of the survey, it will have to be primarily a federal undertaking. This ought not to stand in the way of cooperation however between various other agencies, primarily states or groups of states. Re-surveys will be necessary at intervals to take care of changing physical and economic conditions.

How are we going to get these surveys? They will come in much the same way that other surveys have been brought into being. They have come through public support engendered by the efforts of those who appreciated, believed in, and worked for these goals. Some of those who will lead the way to watershed surveys are perhaps members of this Division. On their side will be the conditions which emphasize the need for these surveys. The need will grow as watershed conditions worsen and demands on the water resources increase. Our task now is to awaken public opinion.

Protection Requirements

With survey data available, protection requirements for the watersheds can be prepared. Some classification would be necessary according to intensity of water use and the potential hazard to the water resource under various forms and intensity of use. Roughly, there would be perhaps four protection zones. Zone 1 would consist of areas on which no use of any kind would be permitted because of their importance to water supplies and their high damage potential under use. The greatest area in this category will be those watersheds which under heavy use have so deteriorated that full protection is required for recovery. In time full recovery may permit limited use of some areas. These are truly "protection forests."

Zone 2 includes areas on which limited use such as grazing, recreation, and timber cutting would be permitted. These are "protective forests." Zone 3 would be an extension of the second providing for all uses on a somewhat restricted basis as seasonal use. Finally, there would be areas of general use upon which there would be no restrictions (Zone 4).

The zone assigned each watershed or the protection required would be subject to change either as conditions on the watershed change or as the watershed resources assume greater or lesser importance. For instance, a heavily timbered watershed requiring full protection because of proximity to a municipal reservoir may be reclassified say from Zone 2 to 3 as new logging techniques permit removal of timber without initiating surface runoff and erosion. Elsewhere, urban and industrial growth may require that new restrictions be placed on watershed use to guarantee water of the desired quality or to guarantee ground water replenishment to some distant user.

In the next 50 years, public ownership will be directed more and more towards watershed objec-

tives. The early Weeks Law had this much in mind, but the Clarke-McNary Act stimulated other types of federal forest land ownership. Those acquisitions excited states and more recently, municipalities to take an interest in public ownership of watershed lands.

Zoning of land will assist this movement. Watershed surveys will lead to zoning, and delineation of areas will guide acquisition. Public attention will be directed first to the high hazard areas. These without question should be in the hands of some public agency—federal or state—which can have and carry through long-time public policies and undertake measures that do not yield economic returns. Only in strong public hands can the public values in protection forests of Zone 1 be realized.

The public should also own and control the greater part of Zone 2. As limited use of resources is required, private ownership could not afford to accept the reduced income this implies. Federal, state, and local public agencies will be concerned.

In Zone 3 there will be some public ownership. It should be limited to certain border line areas as between Zones 2 and 3, or will include important areas of local significance. Here states and local public groups will take the lead, though there could be some extension of federal acquisition for timber production or social purposes.

Public ownership is not essential in Zone 4.

Today many state and local governments are not doing their job adequately. They have lands but they give them no care, no protection, no management. Regardless of watershed values they are handled for resource exploitation alone.

To meet protection requirements federal acquisition should, in general, include "non-use areas" or areas on inter-state streams, or areas which form sizable portions of watersheds above federal public engineering works. State ownership would include areas of limited or restricted use and especially in watershed units largely intra-state in character. Cities and counties would perhaps be most interested in acquiring the lands in their own water yielding areas.

How will this be done? How will these areas be acquired? There have been many proposals for acquisition of wildlands for watershed protection. Results in forty years have not been outstanding, but progress has been made. The strength of a public acquisition program for watershed purposes would lie in its public support. From watershed survey data, each community could be informed as to the source of its water and condition of the watershed from which it comes. From this it would determine whether public ownership would provide the needed administration and management. Similar information would be made available to irrigation and conservation districts, states, and other public bodies. Such information would help the public understand the values involved. Once the public is aroused as to is needs, it will find the way to protect its interests.

Public Management

Public ownership of watershed land should but does not necessarily mean desirable or proper watershed management. This is recognized by all those who have seen the management of some public lands at close range. City lands have been improperly handled; state lands have been neglected; federal lands misused. Were there a proper understanding of watershed management by all public forestry agencies, there would be no great unhealed skid-roads following logging on public forests, there would be no raw gullies scarring the public range, there would be no roadside sores on the public lands. There would also be a greater interest in the soil and its cover by public foresters and administrators. And there would be far less sediments in our reservoirs. Because of lip service rather than intelligent and thinking service to watershed management, timber is sold without adequate restrictions as to its removal, logging methods destructive to soil and water resources are permitted, destructive range practices are tolerated, roads are built where they should not be.

Public forestry does not necessarily mean any better watershed forestry than private forestry, or better range use than private use. But, where forest and other practices on private land are dominated by commercial motives, those on public lands should be concerned with public values not always measured in strictly economic terms.

The need, therefore, is great for an awakened conscience on the part of all public land administrators. It is anticipated that the next fifty years will see a growing alertness to public responsibility, an alertness that will look upon water no less than trees as part of the crop, that will look upon the soil as a real resource, not as so much dirt.

Public Controls

Besides requiring public ownership, watershed management will require some public control of certain watershed lands. There has been much debate within the Society in the past quarter century over public controls. The matter is not ended with the recent Society ballot. Controls of some kind are essential and will come, whether federal, state, or local. Perhaps some of the difficulties in the recent situation might have been avoided had there been a different basis of approach. Federal regulation will have to come if for no other reason than for the nation to protect its tremendous investments in various river development programs. The cost of those now in prospect is about 25 billion dollars. Many of these projects will be affected directly or indirectly by practices in the wildlands above them. The nation cannot afford to undertake costly public works to have them and the civilization based upon them threatened with extinction because of sedimentation or other damage resulting from land abuse.

Legislation will come about only as the public comes to understand that the tax dollars spent on public water resource projects are being destroyed or wasted by land

misuse. Within the next half century many of us will see federal regulation covering the use of all watershed lands above large, federal public works or on interstate streams. We can expect strong state controls on land use practices above works of local significance and of intrastate value. We can also expect state or other local public regulation apply to lands affecting local public or industrial water supplies.

Watershed Restoration — Erosion Control

The previous discussion has been entirely concerned with the protection phases of watershed management, public acquisition, and public controls. These deal with protecting what we now have. Another broad phase of the watershed management program is restoration, the healing of damaged watersheds. Here are many problems of flood and erosion control that must be solved.

Flood control and erosion control are not synonymous. Their difference lies in the frequency of their occurrence. While erosion occurs during time of floods, it also occurs during non-flood precipitation. Of the two, erosion is perhaps the more serious.

Erosion control is involved in all the uses of the watershed. Generally speaking, all land uses carried to extreme will initiate erosion. Since there has been but little restraint on the use of wildland watersheds, some uses have already gone to that extreme. It is not surprising therefore that accelerated erosion is prevalent.

No one really knows the magnitude of the erosion control job. Most of the published data on the subject refer to agricultural lands. Concerning forest and related areas, perhaps it is significant that most erosion control literature deals with the occurrence of erosion under a wide variety of conditions. Seldom is there a report which describes areas where erosion has been controlled. Literature dealing with the public lands gives data as to acres reseeded or reforested, fire lines built, miles of road or telephone, or returns from timber sales. But although all of us are familiar with the occurrence of erosion, there are no reports from any agency giving acreage either where accelerated erosion occurs or where it was halted. Is this not significant in itself?

Erosion control must become the number one restoration job in watershed management. How can it be done? First, on publicly owned wildland watersheds, erosion control will have to be recognized as a first concern of the land administrators. Eroding slopes, gullies, and washing road banks should be considered just as serious an indicator of a poor job done as reports of high fire damage. Control of accelerated erosion should become as acceptable a statistic for reporting progress as timber sale receipts. Acres revegetated and managed without grazing damage should rank in the public agency reports along with number of stock grazed.

Just as long as public forestry agencies do not report on erosion conditions or on control successes or failures, we can be sure that watershed management has not arrived. When a state forester or any other public official shows in his reports that he is as interested in controlling erosion as he is in a new campground, then that state has achieved a watershed management consciousness. That a state has been mentioned is no reflection upon any state: this applies equally well to a federal or public forester or a city water manager.

On privately owned lands erosion control is often thought to be out of the question. It is not. Erosion control can be obtained through regulation of use—prevention is better than a cure. In areas of less than national significance, subsidy payments might help. Such subsidies could take various forms such as tax exemptions, public assistance such as loans or credit, or outright payment. But should the public pay a person for being a good citizen? When erosion control measures are needed and private enterprise cannot be depended upon to make the necessary investments or maintenance, public action is the only answer. And to safeguard public investments, public ownership is essential.

Once the soil is stabilized on our wildland watersheds, future erosion control will be erosion prevention. This will require real management, the exercise of considerable judgment, and skill. For administrators of public land, this will require increasing responsibility as it means restricting land use and at times land income. On private lands, it will be a necessary phase of regulated use because erosion prevention must be one of the bases for public regulation. No other alternative can be considered as the effects of initiating accelerated erosion will be too well recognized.

Watershed Restoration — Water Control

Watershed restoration also involves water control. Here the objective in some cases is to reduce flood peaks, in others to increase water yields, or to decrease losses. The control of floods whose source is watersheds which either in part or whole have been rendered hydrologically unsafe through destructive land practices, is the major water problem and will be for many years. We know no more about the magnitude of the problem than we know about the magnitude of the erosion control task.

Water control for the purpose of increasing water yields through the manipulation of vegetation offers one of the most interesting and attractive aspects of watershed management. It is possible and is coming. It implies positive action as contrasted to the negative aspects of most necessary controls inherent in a watershed management program.

Watershed management to increase water yields will operate only under two conditions: soil stability and maintenance of the measures. By whatever method yields will be increased, whether by reduction of snow interception or of transpiration, the methods used must not create unstable soils. To maintain increased yields, it will be necessary also to maintain the effect which produced them. That is the real problem of management.

The Research Job

To do all that watershed management requires we will need far more knowledge than we now possess. Research has a big job ahead. Two approaches are necessary: first, to get some quick answers needed for controlling erosion and rapid surface runoff; second, to develop concepts of vegetation-soil-water relations as a guide for all elements in watershed management.

Right now we are facing questions which can be answered by the first approach: What are comparative costs of different logging techniques in dollars, in sediment, in water quality? What is safe grazing for different soil and vegetal types and class of livestock—domestic or wild? There are innumerable such questions. These must be answered within the next fifty years; ten would be better.

Moving over to the more fundamental approach, we must determine what takes place in the plant-soil-water environment. There is no pressing need for more data showing that vegetation affects runoff and erosion. There is more need to know why and how this happens so that we will be in a position to put experimental results into practice. We know what a certain treatment does on an experimental watershed. We must find out whether, under the same conditions, the same reaction will occur on the neighboring watershed.

Development of such concepts will lead to techniques which will greatly speed up attaining research results. With present techniques it may take decades to determine precisely the effect of a given silvicultural treatment on water yield. Watershed management cannot wait that long. One reason for the present delay is that we must wait upon an accumulation of streamflow records otherwise we don't know what is happening on the watershed. Although the streamflow measurement integrates all the processes taking place, it doesn't tell which processes occur, or their rates as determined by specific conditions on the area. We know methods are faulty, but we lack better ones. When we have the knowledge and techniques, we ought to be able to do without long term stream measurements.

One thing watershed management research will always need is fresh ideas. Fortunately, watershed activities cut across many fields of endeavor. Ideas in one field often will apply in another. For instance, in establishing erosion control measures in some areas, lack of mulching material is a real problem. Is it too far-fetched to suggest that we go to the micro-biological field to develop a material that will propagate itself rapidly enough to stabilize large areas of eroding soil? Perhaps we could use some radio-active material to trace the disposition of water on a watershed. Going to the field of genetics, for western watersheds we need a plant that has shallow roots, uses little water, produces much litter, and will grow under rigorous temperature and moisture conditions.

Training the Watershed Manager

Advances in watershed management will not just happen. Well-trained men will be required to push them through. This implies good schools and a shift in the emphasis of training.

In the first place, watershed management need not be the title of a course or even of a group of special courses. Rather, it will be given a prominent place in various lines of work. For instance, forest management should include the effects of different forms of management on water and soil and how to direct management to control water yields. In silvics the characteristics of tree species in relation to watershed use should be featured. In addition the curriculum should include courses that will emphasize certain aspects of watershed management; water sources and quality, soil-water relations, geology, soils, and forest climatology.

A notable change in the forest schools of the future is that they will teach conservation. The move is already under way. Strange as it seems, while present day foresters consider in school a variety of subjects that cover the whole range of professional activities, many of them do not understand the elements of conservation: the responsibilities of land ownership; the concept of stewardship, the duty of man to his environment, or the forester's place in human society. Is it too much to expect forest school graduates to be full-fledged conservationists?

Conclusions

Fifty years of American forestry has passed. We are beginning a new half century. Watershed management has just begun to emerge from its infant's garments. In the next period, it should become a full-grown giant.

Watershed management of the next fifty years depends greatly upon what we do in our own generation. If it is to succeed as a primary force, it must attain its place in the sun by what it promotes and what it does.

As a group, most of us interested in watershed activities are not getting our ideas over to practicing foresters. There are too many conflicting policies. Our objectives are too diffuse.

Today, engineering programs for water use and control are in process that call for staggering expenditures. Five billion dollars in the Missouri Basin; 3 billion in the Columbia; 2 billion in California; 2.5 billion in the Ohio. Plans for New England will probably amount to another billion. Proposed expenditures in the South are around 2 billion. If foresters know of these programs or of the relations of forests and related lands to them, land use and forestry literature does not show it. If foresters are interested in these programs, the degree of their interest in watershed management to protect them is not clearly evident.

In basin after basin throughout the country—the Platte, the White, the Wabash, the Delaware, the Coosa, the Willamette, the Colorado—engineers have advanced great water resource programs. These are being threatened or damaged by conditions on watershed lands. Foresters manage the lands for

timber or range or something else, but the public is investing billions in its water resource. It is time to consider what forestry should do, where it should go, and how fast. Can this SAF division in the next fifty years bring about a public realization that the place where water resource programs begins is in the watershed? Can we persuade the public that care of the watershed is as important as concrete? That is the real task ahead.

We need public ownership of critical lands. We need public controls over inimical watershed practices. We need a forward looking restorative program. These things are needed in the public interest. They are needed in view of national interests in tremendous water resource development programs. But as of today, foresters are not pressing strongly for watershed management. If foresters are to attain full stature and measure up to their opportunities and responsibilities, they must awaken to the need for obtaining real management on watershed lands.

Grass Roots Forestry

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FORESTRY PRACTICE consists of a transition from the stage where economic interests, and consequent productive industry, are concentrated solely on extraction of wood from the forest, to one where the range of economics and production is extended to the art and business of growing the wood as a crop—to which the popular name of "tree farms" has been applied. The economic necessity of survival of any private business undertaking, through eventual recovery of invested capital from sales to consumers, applies to timber growing as fully as it does to timber harvesting. In any business, no matter how temporary and fly-by-night it may be, capital must be invested and risk of loss incurred before any of it can be recovered.

Business acutally falls into two classes: temporary, in which it is the intention to profit largely by the recovery of capital assets by sale or liquidation at a profit; and permanent, in which the goal is annual operation and profit, extended indefinitely and terminable only if annual losses continue to exceed profits and capital value thus disappears.

Forestry practice consists essentially of the effort to convert a business of liquidation into one of permanent annual income.

This transition is not easy. It is complicated by two main factors: first, the time it takes, in years, to produce tree crops from seed (the rotation); and second, the enormous element of public interest which concerns itself with management and preservation of the forest resource.

The time element or crop rotation, running for mature forest types from 60 to as high as 120 years would in itself constitute an almost insuperable barrier to private investment if the entrepreneur has to start from scratch, his only possible beneficiaries are his great grandchildren, compound interest on costs, without income to offset them, soars to astronomical figures, and he has no other visible means of support. But the time element simply creates the necessity for overlapping crops, and in a well organized forest of large enough area it disappears, since timber of full size and maturity can be cut every year without exhausting the forest capital as a whole. It does not even mean that individual stands must be cut "selectively" or piecemeal. They can be grown as even-aged stands, provided there are enough of them, properly staggered in age, to keep the wheels turning. It follows that any large concern dependent on wood for raw material must either face liquidation or deliberately plan to manipulate its raw material supplies so as to bridge the coming gap in production which is spanned by the rotation. Meanwhile it must make certain that this hiatus will not occur again, by securing the replacement of the maturing stands through reproduction of desired species—the tree farm. Just such methods have kept certain Swedish forest industries going for over 800 years with no diminution of raw material supplies.

When the unit of ownership is small, as is the case with most of our four million or more woodlot owners in the United States, and cannot ordinarily be self-contained for income on an annual basis, the growing of tree crops must and does become incidental, or a side line, to whatever activity gives the owner his annual income. Either he has a trade, a business, a job, or enough capital to permit him to hold growing crops of timber, or he sells to someone who is so fixed. The argument that woodlot forestry is unstable because of rapid shifting and short tenure of owners has validity only to the extent that these successive owners themselves are actuated by the motive of exploitation instead of that of maintaining a permanently productive property, the sale of which to like-minded owners should result in no loss. The true losses usually come directly as the result of exploitation, leaving a practically worthless property to the heirs.

The second consideration, that of public welfare, has many angles. Preservation of recreational values along lake shores and streams is often the most profitable use to which to put these strips of timber. Watershed protection and control of floods and erosion is in New England, at least,—and we state this advisedly—not a matter of regulating or preventing the cutting of timber, even if clearcut, but instead, one of preventing fire from stripping mountain slopes of humus, and seeing to it that agricultural land once abandoned does not gully. There is no serious watershed or erosion problem in New England which can be materially affected by methods of cutting timber. Provided only that fires are controlled, such floods as have occurred would recur again regardless of forest conditions if the same climatic factors were repeated. The problem of controlling floods, as far as the cover on the catchment basins is concerned, requires no further thought or effort in this region except for the temporary condition of agricultural abandonment, before the forest reclothes these fields. Justification of "flood control" dams must be fought out on some other basis, which comes down to water power. On vast areas in the arid western regions, overgrazing and consequent destruction of the ground cover is the cause of silting and erosion, with timber cutting a minor and easily controlled factor.

The really important consideration concerning the public interest is the economic one of keeping the forest industries alive and prosperous—the problem of growing or finding the raw materials. Here we are faced with a basic controversy. If we accept the fundamental principle that private enterprise is vastly more efficient than public operation of business undertakings engaged in manufacture, is the same thing true when applied to tree farms, or the replacement of the essential raw materials for these industries? Here the obstacle of the rotation or time lag, plus the accumulation of costs without returns, acts as a drag of no mean proportions, especially after forest properties which might have been managed on a permanent basis if taken in time have already been exploited. It has been found by wide experience, in many countries, that under economic conditions that discourage private investment in timber growing, public *ownership* and management are still within the limitations of sound economics, for various well understood reasons in which the priorities attached to welfare, not merely in providing raw materials but in recreational and protective fields, are determinative. It is equally obvious that the greater the area of forest that can be retained *in a productive condition* by private owners, the sounder will be the tax base and the general economic structure. Only when private ownership produces exploitation and a wasting national asset are the scales tipped towards public ownership, and this usually after much irreparable damage is done.

Between these two zones of private and public ownership and management of timber growing, respectively, there is a dark and bloody ground known as "regulation" in which the public, through the exercise of its constitutional police powers, endeavors to secure compliance with measures intended to prevent the deterioration or wasting of forest assets or productivity, by passing and trying to enforce laws to that effect. It is not our purpose to discuss this question here except to point out that laws intended to regulate a criminal minority are enforceable by public support, but laws intended to assert a power over economic life lead to their enforcement, in turn, by a similar criminal minority. In the face of present world conditions, does anyone doubt this? Hence the question of regulating the methods of growing tree crops by law and police methods must be approached first on a state or local basis, with full and intelligent support of informed citizens, and never imposed by a distant authority, against local sentiments. Perhaps we would rather lose our forests than our liberties.

Pressure for liquidation of all merchantable timber to small sizes is rapidly and menacingly increasing. Regardless of statistics, the tendency is to cut to smaller and smaller dimensions, utilizing the product for pulp, chemical wood, and whatever lumber can be obtained, to satisfy a consumption that has exceeded growth, and is capable of continuing to expand beyond any foreseeable early accomplishments in replacement by growth. The statistics on balance between growth and drain when viewed from the field of economics of supply and demand clearly indicate an alarming shrinkage of supplies of "mature" sawtimber size and high quality. Growth and drain are bound to balance but the real question is, at what level? If timber ceased to exist, there would be a perfect balance, at zero!

No longer, in this modern technical age, when wood is becoming more and more indispensable, can we, through the sole operation of immediate economic pressure for raw materials, depend upon the recuperative powers of nature to overcome the handicaps and blights imposed by human shortsightedness upon her formerly efficient processes of reproducing valuable tree species. If we do not shift from exploitation to intentional permanent production, then sooner or later growth will balance drain at a point well below our needs. Yes, there will always be timber of a sort. Defeated in one direction, nature turns to substitutes, and they are not "just as good" but we will have to make the best of them, and that may be a very poor best.

Measures that can be considered, to implement intention to shift from temporary exploitation to permanent production, and applicable in general to all forest types may be listed as follows:

1. Timber should be grown to a size and condition corresponding to physical maturity, at which time and in which condition it is most easily possible to secure reproduction of the desired species, and thus shift to permanent production. This condition corresponds in general with the "rota-

tion" or time required to grow timber crops for the greatest average annual yield of most valuable products.

2. Demand for wood that can be satisfied by use of smaller trees should be met not by clearcutting or premature cutting, but through repeated thinnings, followed finally by removal of the mature crop in a manner that will insure its replacement by reproduction.

3. Complete fire protection is indispensable except for types and species where prescribed fire is demanded in order to secure their reproduction, survival, and protection.

4. Grazing is beneficial to keep down undesired hardwoods, and reduce fire hazards, where reproduction of conifers can be secured. In hardwood types it is probably always detrimental, except possibly to subdue brush preceeding reproduction cutting.

5. Removal of defective, overmature, and inferior trees either in advance of or at the time of final cutting is necessary, either by utilization, poisoning, or girdling.

6. Preliminary cutting of a portion of the stand several years in advance of final cut can salvage undesirable trees, stimulate growth, and improve quality of final cut.

7. Thinning of overcrowded pole stands can increase growth, improve composition and quality, and realize revenue for carrying charges.

8. Weeding of young stands to release desirable individuals must be timed right to be economical and effective, and costs must be kept down.

9. Final cuttings must create favorable conditions for reproduction and survival of the species desired.

10. Planting or seeding must be done only when the chances of establishment and survival are known, and the cost is justifiable on the basis of results.

11. Measures effective for control of destructive insects or diseases must be assured, usually in cooperation with public agencies.

12. In general, even with forest types composed of shade-enduring species, light should be given to insure normal growth and reproduction. This requirement favors group or strip cutting rather than all-aged single tree selection.

13. Plantations should be spaced at not less than 6 x 8, preferably 8 x 8 feet, and thinnings undertaken to preserve at least one-third of the total height in green crown.

Cotta's Preface

"Forests form and thrive best where there are no people—and hence no forestry, and those are perfectly justified who say: Formerly we had no forestry science and enough wood; now we have that science, but no wood.

"One could say with the same justice: Those people are healthier who do not need a physician than those who do. But it would not follow that the physicians are to be blamed for the diseases. There would be no physicians if there were no diseases, and no forestry science without deficiency in wood supplies. This science is only a child of necessity or need, and need is therefore its natural concomitant; hence the phrase should be: We have now a forestry science because we have a dearth of wood."—From *Anweisung zum Waldbau* by Heinrich Cotta, first published in 1817, the last edition of which appeared in 1865.

Planning a Public Information Program[1]

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PRIVATE BUSINESS today is merchandising intangibles as well as selling its tangible products. Pronounced idealogical drifts toward socialistic systems of management, particularly in natural resources, show a growing need for the economic education of people in understanding how American business operates.

In selling its machine-made products, a company must study its customers' likes and dislikes. In merchandising intangibles, the same rule applies even more forcibly. The principal customers in buying "ideas" are the company's employees. Their thought impact on other people in their home community, like the slowly spreading ripples of a stone cast in a pond, have a saturating effect on their neighbors.

Today many of the nation's business men realize that they must devote as much time and effort to the "public relations" of their enterprises as on finance, distribution, and production. They know that "good performance, unless publicly appreciated, is not good public relations."

Like an individual, a company must be a good community citizen as well as a good employer; it must work toward sound social as well as sound economic objectives. An effective public relations program has two purposes. It makes friends for the company and for its products among employees, shareholders, and citizens. This helps create a receptive attitude and loyalty for home town industries. Good public relations also builds understanding, by increasing public and employee knowledge of the company, raising the level of economic understanding and convincing people of the merits of a free market system.

Stigma to be Overcome

Companies engaged in harvesting timber and manufacturing forest products are special victims of public misunderstanding. Trees have always been regarded as an inviolate creation of God and as something to be preserved, not conserved. As yet, many people do not regard the forest as a replaceable resource, supplying raw materials which can be regrown for future generations. They sentimentally curse any mortal who lays an axe to a tree, even if it is mature or over-mature. The private lumberman, who has supplied lumber to meet a nation's peace and wartime needs, is usually regarded as a particular plunderer of timberland. Paradoxically the state or federal manager of forests may be held in higher esteem, although the objectives, techniques, and end results of all breeds of field foresters today are nearly identical.

In the conversion of trees into useful products, the lumberman has always been accused of being "wasteful," a harsh epithet applied by people unfamiliar with the close economic relationship between available markets and utilization of raw materials. Incomplete utilization of logs has not always been a wilful practice, but frequently one dictated by lack of markets and associated manufacturing technology capable of processing profitably certain sizes and species of "lower grade" logs.

The Weyerhaeuser Timber Company found itself in this general predicament before formulation of its present long-range public information program. It had variously been accused of stripping the country, depriving future generations of forests, timber hoarding, monopolizing business, and many other fancied sins. Because of a close-mouthed attitude on the part of the company in telling people about its activities and their economic importance to twelve communities in western Oregon and Washington and southeastern Oregon, there was some prejudice directed against the company's operations. As a grower of trees and manufacturer of forest products, the company had a dramatic story which needed telling.

Making the Program Fit the Need

A man buying a suit assures a good fit by having it tailored to measure. A company investing large sums in a long-range public information program studies its public, defines the areas of misunderstanding, and tailors a program to correct the weaknesses.

Who and what groups were unfriendly toward Weyerhaeuser and why?

To find the answer to this admittedly large problem, the company in 1947 conducted a public opinion poll in 10 Oregon and Washington plant communities. The poll was designed to measure employee and non-employee thinking on working conditions, labor relations, wages, plant-community relations, profits, taxation, sustained yield forestry, and the company's competitive policies.

Crews with ballot blanks and an inquisitive air circulated among townspeople and workers and asked many leading questions to find out what Weyerhaeuser's neighbors thought of the company as a public citizen.

Is your work interesting? Is it apt to last as long as you want it to? Do you have a chance to try out your own ideas? What are your chances for promotion?

Is the company likely to develop labor-saving machinery which will put people out of work? Are its labor relations fair? Is the company progressive in developing safety devices?

Is the company interested only in profit? Does the company try to prevent competition? Does it try to influence legislation? Does it take leadership in community affairs?

How much timber does the company own? What do you think of the company's sustained yield program? Does the company run things too much for itself? Does it pay its fair share of taxes?

[1]Paper presented at a meeting of the Division of Public Relations, Society of American Foresters, Washington, D. C., December 15, 1950.

When tabulated and summarized the poll contributed valuable data, useful as a foundation upon which to build a public information program.

Two areas of major misunderstanding showed up clearly. First, the company must show how job security, opportunity, and community stability were offered by Weyerhaeuser's tree farming and logging operations, because there was considerable concern over the possible impact of future unemployment, shortages of timber to feed the mills, and the company's leaving a ghost-town. Secondly, economic education was seriously needed to inform people that the company paid its fair share of taxes and other costs of government.

Who were the people who knew least about the company's policies?

The poll showed greatest misunderstanding among working people, those newer to the area, and people not close to company operations, unfamiliar with technical terms and unexposed to company employees. The poll also showed that much of the general public had a fairly favorable attitude toward the company.

What to do about it?

Any program must have a statement of objectives. Those formulated for Weyerhaeuser's public information program were a simple phrasing of a complicated problem—"To convince people that the company is managing its timberlands and operating its mills in the best interests of all concerned: its employees, the communities in which it operates, the general public, the government, its customers, and the shareholders." Thus were defined the six special groups at which public information efforts were to be directed.

All groups needed to be given the following information:

1. The company is engaged in tree farming—growing, protecting, and harvesting timber—to supply a continuous flow of raw materials for permanent operation of company mills.

2. The company is improving and expanding its manufacturing techniques, modernizing its machinery, and expanding its operations, thereby providing more and better products, more jobs, better jobs, and community stability.

3. The company is carrying on continuous research and development in whole crop utilization, so that a greater share of timber harvest is converted into saleable products.

4. The company is financially sound, ethical in its operation, and contributes its full share to the economy of the community, state, and nation.

5. The company pays its full share of taxes.

6. The growing of trees is a long and costly undertaking with many risks and requires the cooperation of employees, the public, and government in preventing fires and maintaining a tax structure which will allow the company to operate on a permanent basis.

7. The company is following a sound, practical plan of quality in making merchandise and selling products, which secures a steady market for Weyerhaeuser products in good times and bad.

8. In the Pacific Northwest great areas of land are valueless except for growing trees and the economy of the area is dependent on growing trees.

The broad objectives were redefined for specific groups which required special consideration. Employees, for instance, were also to be told other things: that the company was a good place to work, offered a fair day's pay for a fair day's work and opportunities for advancement, as well as job security and safe and healthful working conditions, and that it gave recognition to individuals.

The public information program was initiated early in 1948. Weyerhaeuser at that time had one department responsible for the total job of communicating with both the general public and company employees. In late 1948 an administrative reorganization divided these functions between two departments, the Department of Industrial Relations and the Department of Public Information. The former processed all activities relating to employees, such as personnel, training, safety, labor relations, and the general communications program. The second department became responsible for all communications with the general public, particularly on the community level approach.

The Program At Work

Early in 1948 the first step in reaching the public at large was undertaken by the Department of Public Information. It consisted of a series of one-third page advertisements appearing monthly in about 50 daily and weekly newspapers in Washington and Oregon. The 1948 series featured one theme, tree farming, and presented various aspects of this program, told in simple language.

Coupled with this advertising program, tree farming progress and developments were stressed in all news items and feature material released through the Department of Public Information. A booklet *You and Your Company*, published for distribution to employees, presented a pictorial history of the company's growth and accomplishments. A brochure *We Grow Trees* was printed in large quantities for teachers and other segments of the general public. Other media used in reaching both the public and employees consisted of motion pictures, plant employee publications, bulletin boards, speeches before civic groups, plant visits, traveling displays, and the annual report. A press book reached all the editorial services of the region. Large billboard-type signs indicated the principal boundaries of tree farms on public highways. A 16-millimeter technicolor movie *Green Harvest* was completed and made available with a printed teachers' guide for classroom and other use.

In 1949 the continuing newspaper advertising campaign featured a 12-month series on whole crop utilization as effected by plant integration and Weyerhaeuser's accomplishments in developing new uses for wood fiber. Other public information efforts, as in the case of the tree farm program, stressed this phase of the company's operations. A booklet *We Group Our Mills* was developed for public dis-

tribution. Editors throughout the region and country received another press book. A second traveling display, featuring illustrated panels framing an automatic slide projector, told the manufacturing story in communities.

In 1950 the newspaper advertising program featured sales and merchandising of forest products. In the middle of the year, because of the Korean situation, this frequency and style was changed to the more appropriate theme: "American Production for Better Living in Time of Peace, Greater Strength in Time of War." Advertisements appeared twice a month instead of once. A brochure *Men, Mills and Timber,* was prepared for mass distribution to employees, share-holders, and the general public. In this booklet Weyerhaeuser listed its accomplishments for the last 10 years and described its greater readiness to meet the new war emergency.

During this entire period the company's program of plant tours received special attention. Visitors of all types, both local and tourists, were invited to see Weyerhaeuser mills in operation. Scale models of the plants at the host mills showed the integration pattern. Printed visitors' guides and other material were handed out as souvenirs. Teachers' groups became special guests on conducted "show-me" trips. Professional societies meeting in conventions in Portland, Longview, Seattle, and other cities assigned a portion of their program to inspect Weyerhaeuser tree farms and plants. Many thousands of visitors took advantage of these guided tours and saw in operation tree growing and manufacturing programs which they had only vaguely understood.

The company sponsored several special projects of a community relations type. At its St. Helens tree farm in Washington it developed five public parks for recreationists, each equipped with tables, benches, stoves, rest rooms, firewood, and camping facilities. On the Klamath Falls tree farm in southern Oregon, the company dedicated a monument and recreation area to commemorate six civilian victims of a Japanese bomb explosion during World War II. Special editions of newspapers were prepared in cooperation with local editors to describe new manufacturing facilities of a major nature, such as established at Springfield, Oreg. in 1949.

Hospital programs in various cities were endowed through the separately organized Weyerhaeuser Foundation. At Oregon State College of Forestry and the College of Forestry at the University of Washington, research scholarships in forest management were established. High school libraries received book sets on the forest industry. Educational charts on the forest products industry were distributed to schools and the general public.

The annual report became a public information medium. It not only presented statistical financial data, but used illustrated articles and gatefolds to describe tree farming and wood utilization programs. Distributed to employees, schools, and some of the general public, such reports served a valuable educational function.

Employee Education

These activities were programmed and translated into action by the Department of Public Information. Meanwhile, the Department of Industrial Relations had also been working on a coordinated program beamed at the most important group in the public information field, the company's employees.

Although three of the branch operations published individually edited magazines, these communications reached only a small percentage of the company's 12,700 employees. In July 1949 Weyerhaeuser began publishing an overall company magazine mailed directly to every employee's home, so that its contents invited family reading. Edited by a separate staff, this publication helped tell the company's story to its workers. A typical issue includes economic background, feature articles on tree farming and manufacturing, safety program statistics, and a report on new operations. At first issued bi-monthly, the magazine will appear monthly beginning in January 1951.

It is an axiom in industrial public relations that satisfactory management-employee relations are the most important phase of an effective public information program. In the case of the Weyerhaeuser Timber Company, most of its public relations problems originated at a local level, at a branch plant, or in a plant community. Such problems should be handled locally, which requires the dissemination of the company's story and economic information on a personal contact basis, at the community and plant level.

A program was initiated to inform and train supervisory personnel and, through them, the employees. Because Weyerhaeuser's management is decentralized and because each branch plant tailors its own program with advisory assistance from the central Tacoma, Wash. office, the training program has varied considerably between branches. Essentially it consists of a series of dinners or other meetings at which foremen are given economic backgrounds of the company's operation as correlated with those of the American business system. This program recognizes the principle of two-way communication, essential in maintaining informational contacts between the company and its employees.

Within recent months the economic education program has been intensified. A staff member of Opinion Research Corporation has given a special chart-illustrated talk describing the results of opinion research studies made throughout the country, a presentation which clearly illustrates the basic misunderstandings people have with respect to America's free enterprise system. The talks have been given at the company's various branch plant operations, usually at dinners or luncheons attended by foremen, administrative personnel, and a representative group of local businessmen. Follow-up talks will tie in the first generalized program more closely with the company's operations and policies.

In the spring of 1950, a strike of millmen and loggers closed down several Weyerhaeuser operations. During the course of negotiations, the company sent individual letters to its employees, reporting on the conclusions reached at each of the sessions between labor and management. This communication informed employees as to progress being made toward a strike settlement and presented the company's story, which otherwise might have been left untold.

At the branch plant level, employee communications are handled in various ways. Because such communications should be from the employee to the company as well as from the company to the employee, suggestion boxes are standard equipment. In safety meetings between management and the workers, healthy discussion is enjoyed on many company problems. Grievance committees of the local unions bring up issues which need attention. At one plant a "Town Hall" session is held regularly in the plant cafeteria, at which employees may ask management any questions they wish on operating policies.

Social benefits to employees have been implemented. Some of the unions represented in the plants have a non-contributory pension plan. Another union recently received company-financed hospital - surgical - medical benefits for off-the-job injuries and sickness. Wage adjustments are handled through collective bargaining.

Weyerhaeuser's program as outlined is based on the concept that now is the time for plain talk between employees and management. This applies particularly to the people of the communities in which the company operates, because the employee becomes a part of that community as soon as he leaves his daily woods or mill job. The company, like many other American businesses, is trying to do a good job in its corporate management of lands and mills, but the facts need telling.

Effects of the Program

The big question now facing the company after about three years of concerted effort in the public information field is "Is Anybody Listening?" Can Weyerhaeuser point to any changes in attitudes on the part of people in general and employees in particular? Has the information been channeled through the proper media and is the payoff worth the expenditures?

Several methods are available for a follow-up sampling of public opinion. Acceptance of news stories as indicated by clipping services is one test. The editorial columns of newspapers and magazines, which partially reflect public reaction to news releases, feature articles, and published material, have been almost completely favorable to the company's operating programs and policies. Many editorials have commented on specific accomplishments of the company. Such editorial recognition to some degree indicates community attitudes.

Within the last month another forest industry public opinion survey has been launched in one of Weyerhaeuser's most recent operating areas, where new mills, supported by a tree farm, have been established during the last two years. An intensive questionnaire sampling is being made of the entire community and trade area. New questions will be asked, many of which may help measure the "reaching" effects of the company's public information program on employees and the general public.

These are some of the new questions:

What lumber company employs the most people? About which company do you know the most? Which company does the most for the community? Which company operates most efficiently? What company makes the best use of logs in the manufacturing process?

When the tabulations are completed on this public opinion survey, Weyerhaeuser probably will know how effectively its many-pronged public information program has educated the people. Based on indicated areas of misunderstanding, revisions of policy can be made to suit the audience. A useful public information program must be designed to meet known problems, measured as accurately as possible by reliable surveys. There is no room today in the science of public information for a hit and miss program depending almost entirely on press releases or publicity. In the struggle to win the minds of men, a personalized approach must be used, aimed at definite objectives.

Public opinion is stronger than the legislature, and nearly as strong as the ten commandments.

Charles Dudley Warner.

Some Major Principles in Recreation Land-Use Planning[1]

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WHEN LISTING some major principles in recreation land-use planning, we need not resort to hypotheses for more than a few of the items we seek. Most of them are found within the history and literature of American forestry through the past sixty years. We need only to group and interpret our findings.

Public Desire

The first principle often has proved a bitter pill to some in our profession. It is this: *We consistently have underestimated public desire for forest lands devoted to recreation, and the vigorous support which recreation forestry use can muster.* Quite naturally the first lessons were taught among the forests of our most populated state, nor far from our largest city. The State Forest Preserve of New York was the scene for the first act. The Law of 1894, to prevent timber stealing, provided that timber on these properties was not to be "sold, removed, or destroyed." These restrictions were not expected to extend beyond the time when adequate administration could provide orderly multiple-use for forests concerned. But in New York, recreation demands mounted faster than those for lumber, which could be a long time on its way from a distance. In contrast, recreational forests to be useful had to be near. After the Panama Canal opened in 1914, making West Coast forests more accessible, the Adirondacks assumed decreased importance for timber production as compared with recreational use. Lovejoy (*14*) cited this significance by observing that New York kept her Adirondack park intact even when her pulp mills were running out of wood.

Few early foresters other than Henry S. Graves wrote tolerantly of the dominance of recreational forestry over other Adirondack forest uses, and writings were legion. This was the first of several collisions between timber production and forest recreation demands. Always, in the past half century, timber production has been beaten in these tests of strength.

The Axton incident, which occurred in New York in 1904, was one of the most notable of these contests. In it the eminent Dr. Fernow, head of the New York State College of Forestry (then at Cornell) and its school forest, clear-cut a scenic forest area across a lake from the summer homes of financially and politically influential New Yorkers. Appropriations for the forest school at Cornell were cancelled. Dr. Fernow migrated to Yale, where he gave special lectures, and thence to the University of Toronto. His ideas of silvicultural efficiency could not compromise with recreation. Eventually the mistake cost Cornell its forestry school, and Fernow Hall now houses other professions.

Concepts of forestry in that general period were such that Dr. Fernow, one of the principal professional writers of his day, made no predictions of recreational use of forest lands in the bulletin *What Is Forestry?* (*9*) and in his book *The Economics of Forestry* (*10*).

In 1905, foresters ignored the recreation values of forested national parks. In what Chapman (*6*) termed an historic accident, the national parks remained in the Department of the Interior during the transfer of the forest reserves to the U. S. Department of Agriculture.

In 1915, Van Norden (*22*) warned foresters of growing public interest in recreational forests, including wilderness areas, and in 1916 Chamberlin (*5*) stated that we could expect the conversion of national forests to national parks, unless foresters became professionally interested in forest recreation. Since these warnings, Bryce Canyon, Grand Canyon, Grand Teton, King's Canyon, Lassen Volcanic, Olympic, and Rocky Mountain National Parks have been created from national forests. Additions to some of these and other national parks have been made from national forest areas. In controversies related to Olympic National Park, timber production forestry again was markedly worsted by recreation demands.

On August 21, 1921, a noteworthy meeting occurred in northwestern Wyoming. It was held in Twogwotee Pass, to dedicate that pass to motor traffic. Wyoming, still pioneer minded, predicted less recreational and more commercial use, including the construction of a railway up Wind River to the East, and into Jackson's Hole on the West. Governor (later Senator) Carey of Wyoming stated that Wyoming had already given to the nation, in lands of Yellowstone National Park, all the land she could spare for chiefly recreational purposes. Ex-Governor Brooks, for whom the nearby Brook's Lake had been named, supported this viewpoint. H. M. Albright, then superintendent of Yellowstone National Park and later director of the National Park Service, did not contest the issue, and Forest Service officers present did not provoke a controversy. But since then Grand Teton National Park and Jackson Hole National Monument lands have been set aside for recreational use!

In South Dakota, lands secured by the state from the U. S. Forest Service through exchange of school sections were made first into a state forest, and then into a state park which terminated timber sales already in progress.

Recreation Use Growing

The second major principle derives from growing awareness. *The recreation areas we have set aside are used far more than was predicted at the time of their designation.* As early as 1936 Atwood (*3*) asked, "can the national parks be kept unspoiled?" As recently as 1949 Drury (*8*) wrote *The Dilemma of Our Parks.*

[1]Paper presented at a meeting of the Division of Forest Recreation, Society of American Foresters, Washington, D. C., December 15, 1950.

During the controversy which raged in *American Forests* and the JOURNAL OF FORESTRY through the '20's and '30's concerning the creation of wilderness areas, it often was claimed that forests set aside for wildernesses would be little used. But in 1948 Allen (*2*) sought to determine priorities in wilderness use, and in 1949 the Sierra Club worried over "Wilderness: a squandered heritage." Those among us who travelled wilderness areas in 1950, found them teeming with people, some in shorts and *lederhosen* which contrasted strangely with our boots, spurs, and Stetsons. We have only to name an unclimbed mountain or an unreached spot, to challenge someone to essay its immediate attack.

We need not quote long visitor records which are available in great quantities, but we may wonder what the few men who saw to the creation of Yellowstone National Park in 1872 would have thought, had we told them that a million visitors a year would see their wonderland by 1950.

Enhancement of Economic Values

The third major principle is a lesson in land economics. *Lands seemingly in non-remunerative recreation use, enhance the economic value of adjacent private lands.* Our cities revealed this principle in its most accented form. Avenues once famous for beautiful residences and good living deteriorated into slums or commercial rows as the more vigorous and adaptable people sought recreation and space in the suburbs. Only around certain key points did new buildings replace old to keep cities beautiful, dynamic, and free from crumbling. These key points were harbors, railroad depots, other focal points of modern transportation, and open parks. Adjacent to Boston Common, Central Park, Washington Park, and similar areas kept open by the foresight or obstinacy of individuals or small groups, new buildings or worthwhile renovations always replaced the old.

In slum clearance projects such as Stuyvesant Town, in which the Metropolitan Life Insurance Company was enabled, by agreement, to hold usual economic forces in abeyance, or in public slum clearance projects with economic factors not always well considered, recreation space is a key factor in changes made. Hanmer (*12*) noted that taxes first thought lost to local government through the use of land for parks are repaid through the years by the enhanced values of adjacent lands and buildings. Several studies have shown that national parks and similar outstanding recreation areas are today bordered by properties with taxable values increased by their proximity to play space.

How Much Land Is Needed?

The fourth major principle is an admission. *We cannot tell exactly how much forest land is necessary for recreation.* City recreation area planners who can push small tots into sandpiles for amusement, can compute exactly how much area is needed. College recreation authorities can determine how many tennis courts and other prepared areas are needed to accommodate sports-minded students. But forest recreation is as diverse as the people who seek it. Forest recreation begins in the flower pot upon the window sill, and extends into the most absolute wilderness. In each there is the dominance of Nature, the mystery of growth, the outward looking of man feeling his way through a pleasant experience ruled by common sense, knowledge of Nature, and decency, but with no set dimensions as for football fields, baseball diamonds, and ping-pong tables.

We can look to timber-production forestry for errors in predicting land areas needed for a particular forest use. Lovejoy (*14*) showed how wrong the timber-famine foresters were in stating their need for intensive forestry upon all forest lands. In 1933, he was describing the over-production which then attended timber and agricultural production. Today, since World War II, the wheel again has turned, and we wonder about the little pigs killed not very many years ago, and the cutting of timber which was dumped upon a glutted market.

Yet we like predictions. Pearson's (*19*) opinion concerning the ability of 100 million acres to meet the timber needs of the nation was eagerly seized by some (*17*) who coveted whatever lands the timber-producers thought they could get along without. Marshall (*15*) and Coffman (*7*) both made intelligent estimates of minimum forest land areas they felt necessary for recreation use. But returning to our first and second principles, we realize that we may safely return to Thoreau's dictum of over one hundred years ago: "We can never have enough of nature." We never shall have, for as long as this civilization exists. We shall have only what we can hold against the land-use aspirations of other crafts and professions.

Natural Values of Prime Interest

The fifth principle is a lesson in humility. *Man can name a forest recreation area as he will, but its inherent natural values determine the esteem in which it is held, its accessibility being equal to compared areas.* Local ambition and pride have designated areas, of chiefly local interest, with names designed to lure visitors from afar. But in each instance time and the people have relegated the recreation areas into their true statuses. Platt National Park (in Oklahoma) is unknown even to many people in that state. Sully's Hill National Park, in North Dakota, became a national game refuge of great value and interest to local residents, but of minor national significance. Casa Grande, once a national park by implication, is now a very valuable national monument. General Grant National Park became an attractive portion of the greater Sequoia-King's Canyon National Park area. The National Park Service, established in 1916, recognizes this principle and is not repeating these errors of earlier jurisdictions.

Anxiety over confusion by the public prompted some enthusiasts to use the name "primeval" to separate our greater parks from the lesser. Marshall (*15*) listed

"superlative, primeval, wilderness, roadside, campsite, residence, and outing areas." Many other names have been devised, but with no common acceptance.

The Forest Service uses 100,000 acres as a standard to separate its term "wilderness area" from "wild area," but this is an arbitrary standard. One hundred thousand acres of Great Plains wilderness, in the event that we can create a Great Plains National Park, cannot give two men seeking solitude the isolation that an equal area of rugged canyon or high mountain country will afford. Yet, through all this welter of names, we never have relinquished the name "wilderness area," though we never have adequately defined it. It is a rediscovery of our generation. "Wilderness areas" for those who need them are as indefinable as "love" or "God," and in each of these mysterious things there is much of the wonder found in the other two.

Carrying Capacity

The sixth principle is indisputable, but is rarely recognized and practically never applied. *Every recreation area has a carrying capacity which should not be exceeded, if impairment is not to occur.* Trucks, bridges, airplanes, back-packers and pack horses, administrators, corn lands, national parks, and wilderness areas — all things of this earth have a definite carrying capacity. Upon forest recreation areas, carrying capacities vary with three factors: (1) the deportment of the recreationists; (2) the capacity of the soil, vegetation, and wildlife complex for tolerance and repair; (3) the amount of supervision possible. This idea is not new. Coffman (*7*) cited it in 1937. Forestry, range management, and wildlife management all are based upon techniques for determining optimum use and limiting harvest beyond this point. Forest recreation belongs in the same category and will be more esteemed when so treated.

Education in non-destructive use of recreation areas will permit more people to use them. (I wonder when we will ask recreationists to bring all metal and glass containers back from wilderness areas into which they are taken.) Some areas can withstand more use than others. But we shirk our duty until we limit the number of packhorse parties which enter a given area. And we shall not be doing our job until we say to our state and federal legislatures: "We know how many visitors these recreational areas can withstand under the supervision of a given number of men. Last year our funds were adequate to care for 800,000 visitors. Do you wish us to limit visitors to that number this year, or to give us funds adequate to care for 1,200,000?"

Qualities Compared

The utility of the seventh principle may not at first seem clear, but like many facts unravelled from the skein of Nature's mysteries, we may later be able to use it effectively. *Man does not as ably compare recreation quality for one area, viewed at two different times, as he does the quality of two different areas viewed at the same time.* Man's own selfishness, spurred by his intense drive for status, probably explains this phenomenon. Only those to whom ideals, or principles, weigh more than ambition are free of this weakness.

Last March, in Jackson, Wyoming, at the Third Northwest Wildlife Conference, wildlife experts from the various states showed this perversion. Amid the little rivalries which flourished, men from one state were boasting of wildlife blessings which their neighbors then were lacking. And another game man felt abashed because Nature had not placed mountain goats in his state; a situation he proposed to change by artificial transplantation. Here was a childish "I've got something you haven't got," or its reverse, instead of a humble gratefulness for what rampaging man has left and a purposeful awareness of what these areas once contained and may again rebuild.

In 1948, Berryman (*4*) wrote two articles describing the richness of recreation in Arizona and New Mexico, in comparison with the East. Jack O'Connor, a well-known professional hunter and writer, then lived in the Southwest and wrote books and many articles describing its recreational resources. But since then O'Connor has moved to Idaho, which today affords more shooting. Similarly Fronk (*11*) wrote *Africa has Everything.* He was comparing what the hunter could loot from Africa in 1948, as compared with hunting in the United States. He did not recall that Hough (*13*) in 1916 wrote of the passing of African wildlife resources. He did not compare Africa in 1948 with Africa as W. Cotton Oswell (*18*) knew it in 1844.

So it is that recreationists flow toward slight advantages in existing recreation quality, oblivious to what once existed and to what can again be if we know and want enough. Unless we profess that recreation is valuable only in respect to quantity — with quality beyond attainment — we must recognize this principle and govern our education and lands by it.

Conflicts of Use

The eighth principle is inescapably distasteful. *From now on recreational area planners will be involved in conflict with self-styled "practical" men who propose modified or alternate uses for recreation areas.* Most so-called practical land uses involve the production of food and fiber for man, rather than providing beauty and inspiration for his soul. Some practical and economical aspects are involved, but merge always into sentimental and religious assumptions that all people are worthwhile, whereas we suspect that we should begin tapering off on some kinds of humans. At any rate, the "practical" men use all arguments to advance their desires.

"Practical" uses are most difficult to fend off where people face a declining standard of living. Water demands may turn Adirondack lakes into reservoirs for New York. Engineers with itches to build dams talk of food and fiber and living standards, although we throw away potatoes, pay too much for sugar, refuse to buy sugar from

neighboring countries, and lend those countries money with which to buy our industrial products.

Original recreation land-use planning for Dinosaur National Monument recently has been swept aside by the claims of "practical" men centering about Vernal, Utah, who claim need for power available in the dam building planned. In the meantime, we in Colorado are asked to donate clothing to destitute coal miners in adjacent Utah coal fields.

The most recent attack upon recreational land-use by self-styled "practical" men concerns water development projects. The Water Policy Panel of the Engineers' Joint Council (*23*) recently has advocated that monetary evaluations of recreation values related to water resource modification be not assigned, and tends to favor federal aid for water impoundment projects and local financial aid for recreational facilities needed. Economic thinking is so tinged with hypothetical philosophy that without real conflict, recreational land-use planning upon our modified waterways may be ignored. The only recourse seems to be to enact a law, comparable to Public Law 732, to provide that no changes in waterways may be effected for water-power, irrigation, flood control, or other uses, until funds are provided (from whatever source) to secure for the people lands and rights providing full enjoyment of recreation resources created by the waterway impoundment.

Planning

The eight principles revealed by experience are simply stated. To facilitate description, each is in a compartment, free from cross currents of conflicting factors which confuse planning for each recreational area. To be useful, we must combine these principles and apply them to major problems.

1. How many recreation lands should we provide? As many as we can secure and hold against pressures of other land uses demanded by "practical" men. Experience indicates that whatever lands we can obtain will be used. It also reveals that great remorse follows failure to buy recreation lands which later acquire high sale values and are marred by other uses.

2. How shall we classify and designate these lands? For the recreationist we need only to name the extremes — wilderness areas and city parks. Classifications are useful for units of government which administer these areas. They stimulate interest among recreationists who compare the meanings of one classification with another. Names are useful for travelers who tell others where they are going. But recreationists always will compare areas by content, harvest, experiences, distances, and costs involved rather than by name or classification. We have not adequately classified women and gods, though our conscious experience with them extends through many centuries. We shall not sooner classify forest recreation lands to every one's satisfaction.

3. Shall we inventory and create systems for our recreational lands? Obviously yes. Three remarkable studies have inventoried our recreational resources. These were the 1924-1928 studies and publications of the National Conference on Outdoor Recreation, conducted by 128 democratically cooperating organization, and the 1934 *Recreational Use of Land in the U. S.* (*16*) and the 1940 *Study of the Park and Recreation Problem in the U. S.* (*17*) compiled by the National Park Service. These studies have listed and mapped areas available to the public, and have listed lands needed, but have not ventured far into details of management. It is now time for another inventory.

4. The public likes systems. The national forests with their wilderness and wild areas, the National Park System, various state forest and park systems, the Boy Scouts, Girl Scouts, Campfire Girls, and other area and activity systems make "a place for everything" and put everything recreational "in its place." Every vacuum in respect to system sooner or later is filled. Conflicts and rivalries will occur between segments of these systems, but desirable evolution eventually harmonizes the whole.

From past inventories and with present knowledge we should plan complete recreational land systems for every community and commonwealth and for the nation. Such systems should be upon graduated bases, ranging from the flower pot at the window to the wilderness, to appeal to varying abilities and to spread use in a manner least harmful to the entire system.

Comparative quality and intensity of use attending proximity must govern the system and priorities given modifications essential for administrative, protective, public, and private utilities. Let the distant wilderness be as spacious and as natural as possible. Locate somewhat natural, open areas — however modified by civilization — as near as possible to concentrations of people. Upon each area, subordinate man's artifices and let Nature dominate as much as she can. There can be no exact or static scheme of priorities. The status of each recreational area will be shaped by a compromise between idealistic objectives and the compulsions of economic and political pressures. Here is an unending task.

The nature and vehemence of public demand for recreational areas is the greatest instrument for effecting valid plans. Education is one of the greatest devices for arousing and shaping public demand, but tends to be vague and passive unless it modifies the choices and activities of those who use outdoor areas. As long as most economic writers write of recreation resources as unlimited, and as long as we permit visitors to go where they wish, as if there can be no impairment of site, the public will be only passively interested in matters which concern the administrators of recreation areas.

Recreational use must be stopped in one place and flowed into another to prevent site impairment, to permit maximum freedom of choice once an area is reached, and to gain the greatest public interest in the quality and supply of recreational lands. Game managers employ this technique more than

other recreational managers. Colorado game managers use our seventh principle, of compared recreation advantage, to flow hunters into areas needing the greatest harvest and away from those needing the least.

Early seasons in one part of the state draw impatient hunters. A late season in another area attracts those unsuccessful during the regular season. Hunters' choice of sexes lures riflemen from areas wherein only bucks or bulls may be killed. For some areas a limited number of permits is issued. Once a desired "kill" is reached, an area can be closed to further hunting following a 48-hour notice.

If we limit visitors to various parks and wildernesses upon similar bases, while directing them to areas still open, we similarly can flow recreationists other than hunters. To show that natural recreation areas are in short supply will stimulate public interest for the entire system and will cause concern for areas under attack for modification by "practical" men.

Here is no fixed, definite, plan—only unceasing conflict to protect things we hold precious. We never can have a final national recreation land-use policy until we have a national general land-use policy, of which it will form a part. Foresters (*1*) have asked for a national land-use policy, but we cannot have one until we have a national and international plan for mankind based upon something better than *laissez faire* and opportunistic attitudes. Toward these future plans let us take a parting shot. Germany, whose gleaning of forest twigs often has pleased "practical" men, has not been a happy and stable nation. And England did not turn her woodlands and moors into efficient timber-production forests until her hour of greatest austerity, misery, and uncertainty.

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I went to the woods because I wished to live deliberately, to front only the essential facts of life, and see if I could not learn what it had to teach, and not, when I came to die, discover that I had not lived.

Henry David Thoreau.

Planning for Wildlife On a Managed Forest[1]

Kenneth A. Reid
Whitney Industries, Inc., Sabbatis, N. Y.

WHEN I FIRST visited the 96,000-acre Whitney Park in the Adirondacks with Mr. C. V. Whitney thirty-one years ago, I was impressed with the stands of old growth pine along the lake shores, while the land behind had been cut in much the same manner as other logged areas. Inquiry divulged that Mr. William C. Whitney, grandfather of the present owner, had stipulated no-cutting strips extending back 150 feet from all lakes and ponds in the lumbering contracts. So far as I know, this was the first large scale lumbering operation on which shoreline protection had been generally practiced. More recently, in 1929, this principle was recognized by the U. S. Congress in the Shipstead-Nolan Act, affording similar shoreline protection on most of the Superior National Forest.

In Gifford Pinchot's book, *Breaking New Ground*, the Whitney Park is described along with the adjoining Nehasane Park, as "the cradle of American Forestry," where he and Henry S. Graves did the original field work. So, tradition as well as natural inclination are incentives for maintaining Whitney Park as a model for sound forest management. But more than that; it is a marvelous outdoor laboratory for the study and application of sound conservation principles in the whole broad field of land and water management, in which forestry is only a part.

Biological Survey Made

My first year has been one largely of study and planning. Fortunately, a comprehensive survey of the timber resources had just been completed by our forester, George Trafton, and plans for sustained yield were mapped out. But apparently the wildlife had never been covered by any comprehensive long range management plan. Sporadic efforts at fish stocking had been made here and there; the outlets of certain ponds had been screened to keep the fish in, and then these barriers removed on the opposite theory that more fish would come up than would go down. But there was a woeful lack of continuity and planning, or factual material on which to base an intelligent wildlife management program, and records of what had been done were scanty or non-existent.

Our first major undertaking, therefore, was a biological survey of the waters as a base for developing an intelligent fisheries management program. R. O. Beatty, conservation director of the Izaak Walton League of America, headed the survey, and Dr. A. S. Hazzard, director of The Institute for Fisheries Research, and Dr. John R. Greeley, chief, and Dr. Mason Lawrence, regional aquatic biologist for New York, assisted in a consulting capacity. During the six weeks of the actual survey, we were able to cover only the Little Tupper watershed and Salmon Lake. It will require at least as much time next year, and probably a full three months, to complete the essential fact finding on what goes on under the surface of the 55 lakes and ponds, seven major brooks and numerous tributary and outlet brooks. Meantime, we will go to work next spring on the waters already covered. We expect to be busy all winter mapping the lakes and ponds and taking depth readings, bottom samples, and water analyses through the ice.

Perhaps I should have some temerity about addressing a group of professional foresters. Some of the soundest conservationists I have known were foresters, such as my good friend, the late Aldo Leopold, to mention just one. But the breed of "saw-log foresters," who can't see the forest for the trees, who gets the jitters whenever he sees a stand of mature timber anywhere that is not to be cut, and who looks upon a forest purely as a tree farm for production of the maximum board feet or cords per acre, is not, in my opinion, a sound conservationist. Nor are some other specialists, namely the great engineers of two overstuffed government bureaus, who talk much of water conservation while competing with each other to see who can pour the most concrete, spend the most tax money, and make the greatest changes in the landscape and waterscape of America. They remind me of an old horse with blinders going down a road. They can see clearly straight ahead down their own narrow groove, but have no knowledge or concern about how their activities may impair or upset related values on either side.

It seems to me that the greatest weakness with the conservation movement lies in the great number of enthusiastic specialists turned loose on the landscape, each eager to demonstrate his prowess in his own particular field, often oblivious to all others. We need these specialists, but we also need a few "field marshalls" to coordinate their activities and avoid headlong collisions if the natural resources of America are not to suffer. It is now my job to effect that coordination in the use of all the natural resources of Whitney Park.

Whitney Park is similar to many other wild forested areas in at least one important respect: the fisheries and the aquatic environment on which they are dependent, are largely an unknown quantity. Man can see and study accurately what goes on above the surface of the land, but it is not so easy to study the picture beneath the surface of a lake or stream. As a result, many fisheries programs have been inaugurated by guess, and fisheries management as a science is still in its infancy compared with many other sciences dealing with terrestial activities. We are, therefore, bound to make some mistakes, but we intend to get the best information available before we do.

The elevation of the lakes and ponds on the property ranges from 1,700 to 2,000 feet above which the surrounding hills rise another 500

[1]Paper given at a meeting of the Division of Forest Wildlife, Society of American Foresters, Washington, D. C., December 15, 1950.

to 1,000 feet. Originally it was purely a trout country, with brook and lake trout the only indigenous game fishes — unless one includes the common sunfish, which oddly seems to have been native to Adirondack trout waters. Many years ago small mouth bass and yellow perch invaded the waters draining from the south and east sides of the property into Forked and Long Lakes. But in the whole watershed of six-mile Little Tupper Lake above the outlet fall into Big Tupper Lake, and in Salmon Lake on the west side of the property, the native trout still reigns supreme without competition from introduced spiny-rayed fishes.

I have long contended that too much dependence has been placed on artificial propogation and stocking of fish and too little on correction of environmental deficiencies; and that blind stocking has often done irreparable harm: viz. the yellow perch, which has ruined countless trout lakes and ponds. So, in this first year, we have done no stocking, except for 10,000 1½ to 2-in rainbow trout in one watershed where the yellow perch has apparently all but eliminated the native trout. Whether the rainbows can cope with the yellow perch remains to be seen, but they can't do any harm, and it is worth a try.

I have never agreed with the view that stocking of small fingerling trout is a waste of time. It is if they are dumped indiscriminately in large fish waters, but when distributed widely in the little waters where Nature places such trout, it is quite a different story. Certainly those that survive to catchable size are vastly superior to the semi-domesticated specimens resulting from legal size planting and in the next and subsequent years, there will be more of them left in the stream.

We did not just dump these fingerlings into one lake or stream. Months before their arrival, we studied the little tributaries, plotted the stocking points and access routes on maps, and lined up the personnel for the job. When they arrived the first week in May, we were ready with fifteen men, automobiles, trucks, boats and canoes, and eight backpack fire tanks to get them to their allotted destinations. For a time, I feared we might have scattered them too thinly, but in mid August was elated to recover with the electric shocker several 3 to 3½-inch rainbows in only two short sections of two small stocked tributaries. The results of this stocking in the next and subsequent years will be interesting and specific, as there are no other rainbows present — and if our stock is the strain of non-migratory rainbows they are supposed to be, the record should be good.

An accurate record of the fish caught is important to a fisheries management program. As all fishing here is by written permit, we have made a report of the catch a condition of all permits. The same has been done with hunting permits. Incidentally, I am impressed with the amount of water surrounding the trout, but the deer look better, as the take of bucks this fall was better than one for each 2,000 acres without any hunting in a large part of the inaccessible interior.

The major limiting factors to trout throughout most eastern waters exist here, namely high summer temperatures and low summer volume of the streams. Therefore our main efforts have been directed toward correcting these two weak spots in the streams and the watersheds of their origin. This brings lumbering and forestry under inspection.

Timber and Fish Management Coordinated

In recent years some of these operations have not been what they should be, or were supposed to be —especially during World War II. Some cutting was bad. Shoreline protection was ignored, brooks were commonly filled with tree tops, and the logging roads with inadequate drainage and bulldozed earth fills across watercourses, all tended to raise the temperature, reduce the volume, and impair the quality of the streams. Bad or careless lumbering practices may make good food and cover for deer and grouse temporarily, but they are all on the debit side for trout habitat.

Our logging contracts now provide: (1) No cutting within 150 feet of any lake or pond. (2) No cutting within 50 feet on either side of any brook. (3) No tree tops felled or left in the water. (4) All obstructions to the natural flow of water removed on completion of operations. There are, of course, other important ones, such as no hunting or fishing by lumberjacks, but these four are most important for correcting the major deficiencies of the streams. We are now working on a plan for revision of logging road construction to eliminate many of the bad effects of the present system. I hope to see the day when we will build our own roads and do our own cutting with proper regard for these matters. Meantime we have an educational job with the foremen and crews to overcome some of the ingrown practices, such as dropping tree tops into the brooks!

Beaver — A Problem

The other big factor in the rise of stream temperatures is the beaver. The ultra protection afforded this animal has brought about such a great increase that, I suspect, there are more beaver on this area than when the first white men came to the Adirondacks. This is understandable when we consider that man has practically eliminated all the beaver's natural enemies, including the Indian. At any rate, I am convinced after a careful study, that there are far too many beaver on this and adjoining properties, and that until more than half of them are removed, our efforts to improve trout fishing will be greatly handicapped.

But entirely aside from his impairment of trout habitat, my observations justify the flat statement that during the past twenty years, the beaver on this and some adjoining properties has destroyed more timber than all the forest fires put together. The aspen and other trees felled for bark food are negligible compared with the hundreds of acres of dead trees of more valuable species standing in

the flooded areas of new beaver dams or the dry meadows of old ones. Apparently this flooding of land causes a physical and chemical change in the soil which inhibits reproduction and growth of trees for many years after the pond is gone. At any rate, many old beaver meadows, dry for more than twenty years, still support nothing but grass or alders.

Foresters and fish and game men should get together and give the public facts on the beaver to debunk the popular stories about "Bobby Beaver, the Great Engineer." Many trout fishermen also need factual enlightment. They find a new beaver dam on a familiar stream and enjoy improved trout fishing for a year or two. Then, when fishing falls off badly in subsequent years, as it usually does, they blame the conservation department for not stocking more trout, rather than the beaver for ruining the trout habitat.

During the 1950 season, 42 beaver were taken here, but during the summer an increasing number of new dams appeared. The main spring tributary to Charley Pond Stream was spread by 14 beaver dams over more than a hundred acres of shallow ponds through killed timber. The temperature above the highest dam was 54 degrees; where it entered Charley Pond Stream, it was 70 degrees—2 degrees higher than the receiving stream. The volume was reduced by well over 50 percent and the acidity had increased. Two weeks after we tore out all these dams and one big house, we found 18 new dams as a reward for our efforts!

On Bog Stream we found two new beaver dams completely blocking migration of trout from the lake to the stream gravel beds. We tore out the center of one dam five successive days, only to find it rebuilt each morning. With live traps, we then took seven beaver at this dam and one at the other. The dams do not hold water for long after the beaver are gone, and the bed of the stream, both above and below the dam, is then blanketed with silt. Of the two, beaver dams on the spring tributaries probably do more harm than on the main stream by reducing the volume and increasing the temperature, plus killing a relatively larger amount of timber.

Summarizing the effects of beaver on trout waters: (1) On spring tributaries, the temperature is raised and the volume diminished by exposure of wide, shallow areas to the sun; and the acidity is increased by decomposition of flooded vegetation. (2) On main streams, these effects usually are not so great, but natural reproduction may be precluded by blocking access to essential spawning areas. The general long time effect is a basic change in aquatic environment more favorable to undesirable trash fish and less favorable to trout, with a great increase of the former and a corresponding decrease, and sometimes practical elimination of the latter.

For warm water fish and waterfowl, beaver dams may provide some benefits, but an abundance of beaver in trout waters is definitely detrimental, and sometimes fatal. The only general exception I have found is in the high country of the western mountains where the eternal snow water, cold nights, and steep gradients do not allow the water to warm up enough for optimum food production and growth of trout.

Stream Improvement Work

This first year, our work has been confined largely to trying to cope with present beaver and removing from the streambeds accumulations of debris from former beaver activities. On Bog Stream, our experimental development stream, cutting a canoe channel through the alders was an essential preliminary. This proved excellent stream improvement from the trout's standpoint. For several miles, the alders dipped down into the water from opposite banks with their stems extending underwater clear across the stream bottom and their tips curving upstream, forming effective hooks for catching any debris drifting along the bottom. This widened the channel and arrested the current to where it was scarcely perceptible. Cutting out these underwater alders with their accumulation of debris, released the flow so that an appreciable current developed in a narrower and deeper channel, and this faster current scoured off the blanket of silt and sand, exposing some fine gravel beds. Removal of countless sticks and small snags buried in the sand bottom aided this desirable work of the current.

The next step was cleaning out the channels of small tributaries so they would be narrow and shaded. Where they spread out in a thin sheet over an exposed muck delta, this was most effective. Temperature readings before and after commonly showed a drop of more than five degrees at their mouths, and I am satisfied that in some cases, the volume reaching the main stream was appreciably increased.

With the wood debris excavated from the sand bottom and logs trucked to the highway crossing and floated to the sites from there, we began construction of current deflectors, bank cribbing, and other devices designed to make better trout water. In the spring, we will resume this work, using sheet piling on the faces of some for more permanent, watertight structures.

To augment the summer volume of Bog Stream, we will construct a low dam on one of its headwater ponds to hold back the spring runoff until about July 1. Then this stored water will be released gradually through a bottom valve over a two or three months summer period when the stream needs this water most. By holding approximately the spring high water level until July 1, the pond will remain to all appearances a natural one without the barren, unsightly shore-line common to artificial reservoirs with greatly fluctuating water levels. Yet, a preliminary survey indicates that a mere two-foot stored head in this pond will supply 600 gallons per minute additional flow to the stream for ninety consecutive days. The minimum flow last summer was just under 500 gallons per minute.

After the results of this initial installation are checked, we expect

to utilize other headwater ponds in the same way. Such installations should not only materially improve existing stream fishing, but create additional mileage where summer flows are presently inadequate. And they will constitute the soundest form of lake improvement and flood control, helping to level off the peaks of both floods and droughts in all the waters below.

The first rapids in Bog Stream is totally unlike the lower five miles of smooth, slow flowing water. In the rapids, the grade is steep, with a wider channel filled with irregular rocks and big boulders and the current dissipated and divided by them into dozens of miniature runs. The few pools are shallow, and I have never found a trout in this quarter mile of rapids, although they lie in the deeper water immediately above and below. A little experimental work in moving loose rocks from the bottom and using them to block off side diversions has greatly improved the appearance and increased the depth, and at the foot of the rapids has created an ideal spawning area of gravel. Similar treatment on up the rapids, adding a few deeper pools, can make habitable trout water here.

Last spring we made a small experimental planting of evergreens on a bare meadow stretch to protect the stream from the afternoon sun. Between the deer eating half of the white pine and the muskrats using a like proportion of the spruce for nest material, it was not too successful, but we shall continue the experiment next spring, trying some additional species.

How much the trout of Bog Stream may contribute to the supply in Little Tupper Lake, or vice versa, is at present a matter of conjecture. To find out, we are clipping the right ventral fin on trout caught and released below the first rapid and the adipose fin on those above. On those in two other principal tributaries to the lake, we will clip the right and left pectoral fins. Additionally, we will install on Bog Stream a diagonal weir and two-way fish trap. Migrating trout will be passed through while the too numerous trash fish will be removed.

Major initial attention is being given the fisheries because of Mr. Whitney's especial interest, and because this resource has suffered more from the beaver and careless logging practices. It is our intention to assemble the best information available for intelligent, well-coordinated administration of all the natural resources on Whitney Park. Our hope is that the results of our work in this outdoor laboratory may constitute a valuable contribution to sound land and water management as an essential base for better forests, better fish and game crops, and an all around better outdoor America.

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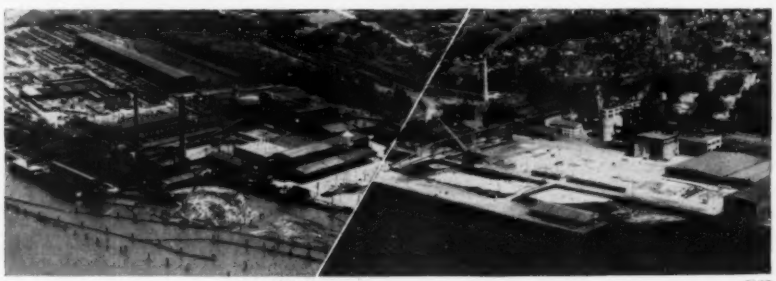

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Watershed Aspects of the New York Water Supply Problems[1]

Charles R. Hursh
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WE ARE INTERESTED in New York's watersheds, not only because they belong to one of the greatest surface water supply systems in the world but also because they furnish examples of all the varied watershed problems that are encountered in the eastern United States. On every drainage area there is to be found both private and public land. The land use ranges from highly improved dairy farms to state park and forest preserves, and these occur over a wide variety of topography and geology.

Greater New York requires about 800 million gallons of fresh water a day. Mid-summer uses have been as high as 1,400 million gallons a day. To supply this amount of water would require the average flow of one cubic foot per second per square mile from 2,160 square miles. For 800 million gallons per day, 1,200 square miles would be required. The combined area of all New York watersheds, excluding the East Branch development not yet completed, is only 1,250 square miles. During the summer and early fall months, July through October, New York streams yield on the average less than 1 cubic foot per second per square mile. Sometimes the daily average flow for an entire month has been one quarter of this amount, or less. The months of March and April produce the largest yield, sometimes as much as 40 percent of the entire annual runoff. Although the highest rainfall based on the 80-year record of the Croton area occurs during the months of July and August, these are the months of lowest amount of runoff.

Under these hydrologic conditions it is obvious that reservoirs must be employed capable of storing a 3- to 5-months' supply.

Any form of watershed management that would increase the amount of stream-flow only a small percent during the early summer would be of extremely great value. Whether or not any such increase can be brought about by watershed management techniques is a subject for considerable practical interest.

The Croton System

The watersheds now supplying the metropolitan area of New York City have benefited by the long and progressive history of forest conservation in the state. Interest in protection of the city water supply appears to have been a factor in the gradual increase in the amount of forest on the Croton watershed following the construction of the original Croton aqueduct in 1842. Within the present forests of the Croton watershed are to be found numerous old stone fences that once marked the boundaries of cultivated fields. Abandonment of these fields was in part a conscious effort to reduce erosion on the land areas furnishing the New York water supply. Some of the abandoned fields have grown back to trees naturally and some have been planted.

This change from cultivated land to forest on the Croton watershed was associated with the development of summer homes and country estates. Nevertheless, there was a clear-cut public opinion that the watershed should be protected by forests, and during this period many tree plantations were established on private estates within the Croton drainage.

Considerable land adjacent to the reservoirs was acquired by the city of New York at the time the reservoir sites were purchased. In 1917 extensive plantations of Scotch pine were established on these city-owned lands. One objective was to reduce the amount of hardwood litter getting into the reservoirs; however, this objective was not carried through completely because today most of the reservoir shore lines are still occupied by hardwood forests.

Today the entire Croton watershed has an excellent vegetative cover throughout. Such land as now remains in gardens, fields, and pastures is well maintained in a state of fertility and practically no serious erosion is encountered.

Cutting Not Permitted on City-Owned Land

Commercial cutting was not permitted on any of the municipally owned land within the Croton watershed. As a result, the 1917 plantations became exceedingly dense and developed evidence of stagnation and insect injury before sanitation cuttings were considered necessary to the health of the stands. Exemption of the city-owned lands from harvesting of wood products has been considered to be in the best interests of the watershed, although the policy has sometimes been questioned. For example, it has been suggested that a wide meadow strip of grass and herbaceous plants would be more suitable than trees for the protection of the reservoir shore lines.

Actually no one has the answer of how best to manage tree plantations established solely for watershed protection. It is reasonable to believe that, for such plantations, prescriptions should be made as to species composition and spacing, primarily to achieve restoration and maintenance of better soil condition. These recommendations might differ considerably from those usually followed on plantation establishment for the locality. Similarly, the subsequent management on the stands may call for special treatment.

On watersheds where the necessity exists for obtaining the greatest possible water yield, it is reasonable to believe that the total amount of transpiration draft should be kept to a minimum where this can be done through practical means. On forest lands this can be approached by maintaining prescribed stands as to composition, basal area, and age class, and by removing unneces-

[1]Paper presented at a meeting of the Division of Watershed Management, Society of American Foresters, Washington, D. C., December 15, 1950.

sary vegetation, such as dense streambank and shore-line vegetation.

Complete Closure Is Not Watershed Management

In any general consideration of the subject, the question frequently arises as to whether or not closure to other uses is always the best procedure for areas set aside for water production. Particularly where its previous history has greatly altered the original forest, judicious manipulation of the remaining stand will expedite and accelerate restoration of natural conditions and associated soil organic layers. The closure of a forest to other uses certainly does not in itself create a natural area.

Even in relatively undisturbed, natural forests complete closure may not be the best policy in the interest of water resources. For example, on soils where the normal wind-throw of overmature timber turns up quantities of subsoil with the exposed roots, the best solution would be the cutting of overmature forest trees prior to being wind-thrown. Still another example is that the decay of tree roots may be less favorable to water percolation and storage where the trees die naturally than where the stems are cut. Stream meanders and bank-cutting are often associated with natural forests where the gradual encroachment of vegetation restricts or changes the course of the stream.

There are, of course, always some areas with steep slopes and shallow soils that must not be disturbed in any way whatsoever, and many such areas are frequently encountered, particularly in mountainous country.

All the facts are not yet known as to the possibilities of stand management for both wood products and maximum usable water yields. For purposes of discussion the point may be raised that an alternate to complete closure of watersheds would be to grow and harvest wood products under careful supervision on productive sites, and to exempt from cutting poor sites of steep slopes and those of shallow soil that are difficult to harvest, or that naturally have a sparse cover. In harvesting wood products from watershed areas it is obvious that logging technics and the construction of roads must be so planned and prescribed that unnecessary soil erosion does not take place. Silvicultural practices must be followed that do not disrupt the normal biological activities within the soil itself. With the improved technics of mechanical logging that are available today, it should now be well within the realm of reality to remove wood products without serious disturbance to the forest floor.

Wood products have been harvested on the watersheds supplying water to the city of New Haven, Conn. Similarly, the commercial timber was removed from the watershed supplying the town of Glen Falls, N. Y. The real problem seems to be one of using reasonable care in protecting the water resource.

The Catskill System

The tremendous expansion in water needs by the metropolitan district of New York at the turn of the century called for further watershed developments in the Catskill Mountains. Here, a complex land-use pattern was encountered. The Catskill watersheds included highly improved farms and well-developed pasture lands. Land values were particularly high along the stream valleys, and the public acquisition of improved land appeared to be prohibitive. However, a considerable part of the mountain lands of the Catskills was acquired as a state park and forest preserve under legislation that precluded any further exploitation through cutting. This procedure is in keeping with the policy to maintain these preserves for recreation, this being considered to be their greatest usefulness to the people of the state. Thus, the forest preserve lands in the Catskills are excluded from further consideration in this paper.

Early records indicate that the original forests were made up of a birch-beech-maple association on the lower slopes and heavy admixtures of white pine and hemlocks on the upper slopes and ridges. Sufficient data are not available to draw any definite conclusions at this time as to the relative efficiency for watershed protection of the existing forest stands on the Catskill Mountains, as compared to other plant species or combinations of species and age classes. Information now available indicates that the fire-damaged forest, characterized first by gray birch, provides a less desirable litter and humus covering on the soil than did the original forest. Due to heavy cutting and repeated fires in the past, white pine and hemlock have largely disappeared. It is conceivable, however, that by the proper grouping of additional conifers on the upper slopes and ridges, it would be possible to influence the amount of snow accumulation during the winter months and to delay snow melt in the spring. At the present time, the last remaining snowbanks in the spring are those protected by the few clumps of hemlock that still exist. This is a subject that also calls for research, and further consideration after additional data become available.

Pasture Land Improvement Urgent

A large amount of the Catskill watersheds is in pasture. Much of the milk produced is shipped to New York City. For example, a land-use survey of the Schoharie watershed showed that about 44 percent, or 88,000 acres, are in grassland. Most all of this pasture is classified as being on steep or sloping land, and 80 percent showed moderate erosion. A portion is relatively unproductive, does not have a good sod covering, and is heavily trampled. From the point of view of watershed protection, this type of pasture land is definitely undesirable. The greatest objection to overgrazed and trampled pasture land in the Catskill region is that during the winter months the surface soil freezes solid to a considerable depth and becomes almost impermeable to water. At the time of spring snow melt this cement-like soil does not permit rapid infiltration or perco-

lation of water. Thawing takes place first in the surface few inches only, and this loosened soil is easily eroded. When spring rains occur, there is a great amount of storm water and snow melt that cannot enter the soil. It moves to the stream channels over the surface of the soil, and is the cause of spring floods and reservoir sedimentation. That this type of surface storm flow is definitely highly erosive is shown by the numerous gullies now present on the steeper, pastured slopes of the Catskill watershed.

In contrast to the heavily used pasture land, the soil under good forests does not freeze solid but permits the easy infiltration and percolation of water throughout the winter and spring months. Obvious changes in present land-use patterns are necessary in the interest of watershed protection. Good pastures should be retained, but steep and unproductive pastures should be eliminated. Fencing cattle off from steep slopes and from areas of thin soil is a definite step in watershed improvement.

Most of the specific details of pasture improvement through the use of fertilizers, seeding, regulation of seasonal grazing, and degree of stocking are rather well known by specialists in this field. The application of better technics to the steep pasture lands within the city watersheds can be encouraged through leadership and organization of the landowners to take advantage of services already available. Improvements that will provide better watershed protection will in every case mean greater profits to the landowners.

Public Assistance and Acquisition

There still remains a problem of designating what land not now in forest on the Catskill watersheds should be planted to trees in the interest of watershed protection. Certainly, unproductive pastures on steep, sloping land must be improved for infiltration and water storage. The actual area requiring planting to trees is not so great but that it can all be planted within a few years through the cooperation of public and private agencies. It is reasonable to believe that a certain amount of this unprofitable pasture land should be still acquired and administered under public ownership.

Technical advice and services in the field of forestry are available. At the present time New York has an organized state forestry program. Under the Forest Practices Act, district foresters and their assistants furnish cooperating landowners with advice on planting, marking, and selling wood products. Agencies concerned with forestry and land management direct their efforts toward promoting the best possible forestry and farming practices. The objective is to recommend good economic practices rather than any specific program of water-resource management. One reason for this is that the scientific principles of water-resource management are either not known or the knowledge has not been made available to those who are practicing forestry on the ground. Another reason is possibly that, in general, the private landowner is not cognizant of his public responsibility for water-resource conservation.

Problems for Consideration

One must conclude that forest conservation measures carried out in the past have definitely contributed to the development and protection of the New York watersheds. However, additional measures are needed at present because of new problems that are constantly arising. Generalizations are likely to be misleading, and recommendations must be expressed in terms of specific land areas and problems to be solved. Detailed land-use surveys and actual field examination of specific land-use conditions are a primary requisite. Consequently, this would be the first step in developing an overall program for the practical management of the New York watersheds.

From such information as is now available, the following watershed problems, given in order of their over-all priority, merit consideration in the administration of the drainage areas furnishing New York's water supply:

1.—Land-use adjustments directed toward reduction of erosion and storm runoff, increase in ground-water storage, and water yield.

a.—Elimination of problems caused by steep, unproductive, and overtrampled pastures within the Catskill system.

(1)—Through pasture improvement and pasture management.

(2)—Through fencing and restricted grazing.

(3)—Through fencing and planting to trees.

(4)—Through public acquisition and management.

b.—Public acquisition of strategic and critical areas other than pasture lands and their management in the interest of water resources.

(1)—For streambank protection and channel control.

(2)—For protection of lands now submarginal or unproductive under present management.

(3)—For control of steep slopes, areas of thin soils, and sparse cover.

2.—Harvesting of wood products on private lands. Improvement of harvesting technics so that wood products can be removed without damaging water values.

3.—Management of forest lands.

a.—Stand improvement directed toward creating increased infiltration and water storage.

b.—Stand management directed toward the accumulation of snow and delay of snow melt in the spring.

c.—Stand management directed toward reduction of transpiration draft by cutting or restricting growth of existing cover.

Notes

Growth of a White Pine Plantation in Iowa

Just before the turn of the century, the Amana Society of Iowa planted eastern white pine on an exposed ridge near South Amana reported to be "so sandy the wind blew potatoes out of the ground." The trees were purchased from a nearby private nursery but no information was available regarding seed source. About 700 trees per acre were originally planted on the 6-acre tract with spacing varying from 7 by 8 to 8 by 10 feet.

The sandy ridge is now covered with an excellent stand of white pine. Only dead stems were removed from the plantation before 1948, but all trees were pruned in recent years to a height of about 20 feet. A heavy layer of needles covers the forest floor. Very little reproduction has taken place within the stand, but white pine seedlings are growing in the scattered hardwoods on an adjacent north slope.

A complete inventory of the 6-acre plantation was made in 1948. Trees were tallied by 1-inch diameter classes. Merchantable heights were estimated to a variable top diameter of not less than 6 inches for sawlog trees (9.6 inches d.b.h. and larger), and 3 inches for the pole-sized trees.

Growth and volume data were obtained from every twenty-fifth tree in the stand, 104 trees in all. These measurements included form class, total and merchantable heights, and radial growth to the nearest 0.1 inch by preceding 10-year periods.

Stocking and volume.—At 51 years, the average acre in the stand supported 425 trees with a basal area of 274 square feet. The diameter of the tree of average basal area was 10.9 inches for all size classes, and 11.9 inches for the 295 trees per acre of sawlog size.

The merchantable volume averaged 33,467 board feet (Int. ¼-inch Rule) or 5,644 cubic feet per acre in sawlog-sized trees, with a total volume of 6,976 cubic feet per acre in trees 4.6 inches d.b.h. and larger. The average annual growth had been 656 board feet or 137 cubic feet per acre per year. The heights of dominant and codominant trees ranged from 63 to 75 feet and averaged 69 feet.

Growth by decades.—The past growth in basal area by decades was computed for each diameter class. Although the average annual increase in basal area had been 5.37 square feet per acre, the maximum growth occurred when the trees were 22-31 years old (Fig. 1). During that period, the stand grew 8.0 square feet per acre per year. The annual basal area increment has decreased steadily since then.

Basal area growth is generally considered a fair indication of the volume added to a tree. On this basis, the data indicate that the stand as a whole produced considerably less cubic foot volume during the past decade than in any of the preceding ones.

This decreased growth rate was due to overstocking; both the number of stems and the total basal area per acre were too high for optimum growth. Figure 1 indicates that the stand should have been thinned when about 30 to 35 years old.

With thinnings at proper intervals the plantation could have produced a greater total volume of higher quality material. A light harvest cut is now being made to release the best trees in the stand. Some wind throw has occurred, but this was expected because of the sandy soil and exposed site.

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Ames Branch,
Central States Forest
Experiment Station.

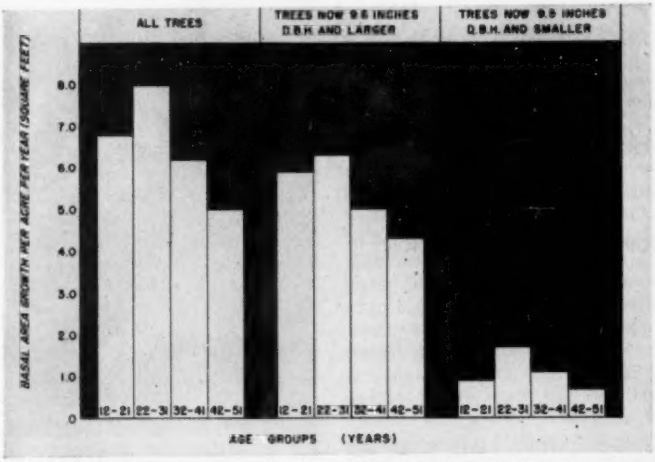

Fig. 1.—Annual basal-area growth of an eastern white pine plantation by decades and diameter groups.

Measuring Tree Heights in Dense Young Stands

Measuring tree heights in dense young timber stands presents a problem for research workers who find it necessary to measure sample plots in such areas. The standard types of hypsometers are unsuitable as it is frequently difficult, and sometimes impossible, to identify tree tops at a satisfactory distance. Calibrated wooden scale sticks are commonly used in sample plot measurement work and are satisfactory for heights up to 12 or 15 feet; above this height such scale sticks are likely to be too heavy and too cumbersome to be of use. The author had occasion to develop a telescopic bamboo scale

rod which proved highly satisfactory for the measurement of heights up to 35 feet in dense stands of young pine.

The method of construction is shown in Figure 1. A discarded pole-vaulting pole 14 feet long was used for the outside section. The nodes were opened by cutting a slot at each joint large enough to permit the use of a chisel. Each joint was then wrapped with adhesive tape. A metal sleeve to which a small pulley bracked had been welded was fitted over the small end of this pole.

A small diameter bamboo pole, the same length as the outside pole, was used for the inside section. The outside of each joint was sanded smooth. A cone-shaped piece of hardwood 12 inches long was glued to the bottom. The cone served as a guide when the length of the measuring rod was being reduced and provided support when the rod was fully extended. The string was anchored by tying it to a hardwood pin about 3/16 by 1½ inches which was then inserted through a small slot at the base of the small pole just above the cone. Alternating one-foot bands of red and white were painted on both poles (Fig. 2).

This rod had several good characteristics. It was light in weight and being collapsible, was also easy to handle. It proved to be very durable in use, showing little evidence of wear after being used to measure the height of more than one thousand trees in a two-day period. The rod proved to be easy to use, particularly with a two-man crew. The rod man simply placed the rod at the base of the tree and pulled the string until the top of the rod was level with the tree top; the tally man read the height from any convenient location. The rod was light enough so that it could be used to measure trees even where they were taller than the length of the extended rod. The operator would raise the extended rod until the top was at a level with the top of the tree and then measure the extra length from

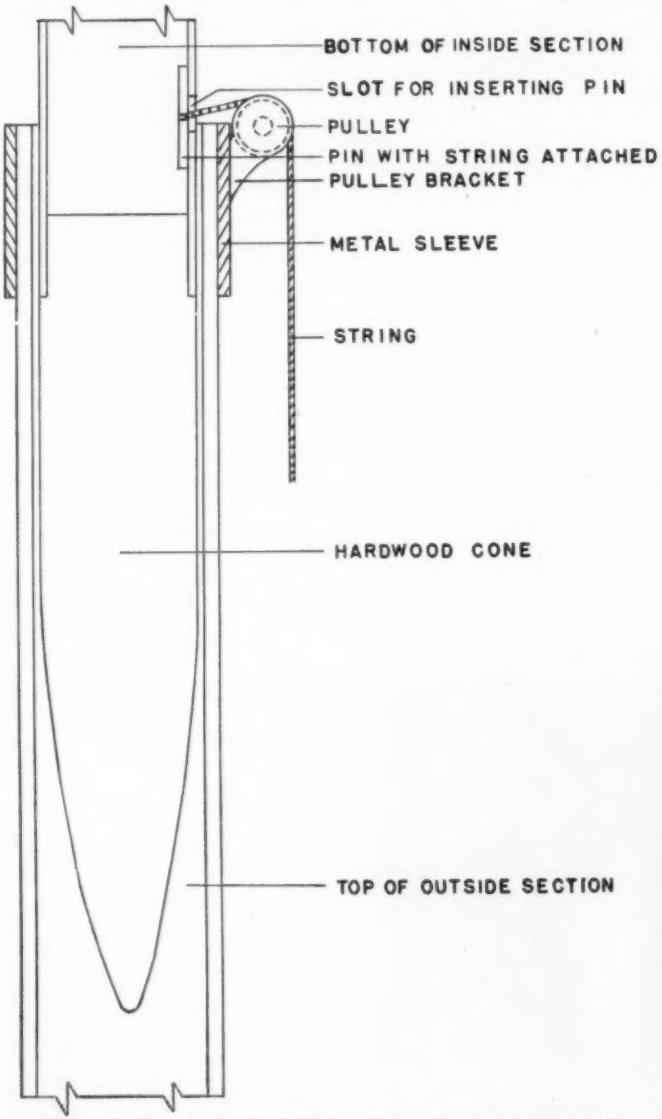

FIG. 1.—Section of telescopic bamboo scale rod showing assembly detail.

FIG. 2.—Telescopic bamboo scale rod partially extended to demonstrate its use.

the ground to the base of the rod. Extensions were readily attached to the bottom of the large pole for measuring trees over 35 feet in height. The rod was easy to construct, inexpensive, durable, and easy to use. It is believed that a similar tool might be of value to others faced with the problem of measuring heights in young densely stocked timber stands.

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Soil Conservation and Research Activities of Department of Agriculture Reorganized

On February 16, Secretary of Agriculture Charles F. Brannan, announced the reorganization of the soil conservation and agricultural research activities of the Department of Agriculture and the reorientation of its staff and administrative structure for defense mobilization purposes. Three memoranda were issued for this purpose. The county offices of the department dealing with conservation will be consolidated. A similar move to consolidate state offices has also been directed.

The reorganization was accomplished by using the existing powers of the secretary and do not depend upon additional legislation.

Following are the provisions of the three memoranda:

1. Coordination of Agricultural Resources Conservation Services

A single policy will govern the soil conservation activities of the department, and the activities will be carried out through a unified and interlocking administrative organization.

The policy is stated as follows: "The basic physical objective of soil conservation activities by the Department agencies shall be the use of each acre of agricultural land within its capabilities and the treatment of each acre of agricultural land in accordance with its needs for protection and improvement."

The conservation programs of the Forest Service, Soil Conservation Service, and Production and Marketing Administration will be supervised by an Assistant Secretary of Agriculture. These agencies will jointly determine the soil conservation practices and rates of payment for the Agricultural Conservation Program. These are decisions for which the PMA has had sole responsibility, although in practice PMA has consulted the other agencies.

This assistant secretary will also maintain a continuous survey of the agricultural resources activities of the department and determine with the secretary such action, including transfers of functions, as may be necessary and appropriate to insure integration, effectiveness, and economy of these activities.

The land and water resources staff of the Office of the Secretary will be assigned to the assistant secretary in charge of agricultural resources conservation services, to assist him in carrying out the department's responsibilities relating to flood control, river basin investigations, and various other matters concerning land and water utilization.

Field work will also be unified.

In each state and county, personnel of SCS and PMA will be officed in the same building.

State organization. — In each state, all conservation policies and programs of the department will be decided upon jointly by PMA, SCS, and Forest Service officials, with assistance from cooperating state colleges and other designated state agencies concerned with soil conservation. The president of the state land-grant college is invited to designate representatives to participate in this work, and the state director of Farmers Home Administration is also invited. The state PMA chairman is charged with the responsibility for taking the initiative in this programming activity. Heretofore, consultation on conservation activities in the states has been carried on only informally and with the present requirement that policy and program decisions be made jointly.

The state conservationist of SCS will be responsible for all technical phases of the permanent types of soil conservation work done by PMA as well as continuing his responsibility for work done by SCS.

The state PMA committee, composed of farmers from the state, will continue to administer the agricultural conservation program, and the state conservationist will continue to be responsible to the chief of the Soil Conservation Service, but he is instructed to coordinate and integrate his work with the PMA state committee.

The PMA state committee is instructed for the first time to aid in encouraging the creation and development of soil conservation districts, which are established under state laws, governed by boards elected by farmers in the district, and are eligible for technical assistance from SCS.

County organization. — Within the outlines of policies and programs applying to the whole state, county policies and programs will be decided upon jointly by the PMA county committee, which is elected by the farmers of the county, and the local technicians of the Soil Conservation Service, working with the governing body of the soil conservation district. The county extension agent and the county supervisor of Farmers Home Administration are invited to take part in these determinations.

The farmer-elected PMA committee will take the initiative in this program planning, will continue to administer the Agricultural Conservation Program, and, in cooperation with the elected governing body of the soil conservation district, will give program guidance to the SCS technician.

The SCS technician will direct the technical phases of the permanent-type soil conservation work and will make recommendations to

the PMA committee as to the proper way to carry out any permanent type technical soil conservation practices financed with Agricultural Conservation Program funds.

Forestry.—Forest Service personnel in the field will coordinate their work with the other conservation activities of the department.

So that all forestry activities of the department may be unified, all SCS forestry activities that can be transferred under present law or future amendments will be shifted to Forest Service.

The Forest Service, cooperating with state forestry agencies, will be responsible for producing and distributing forest tree planting stock, developing plans for farm forestry and shelterbelts, and assisting landowners in carrying out such plans.

Forest Service will also have joint responsibilities with PMA in determining forestry practices and rates of payment in the Agricultural Conservation Program and will continue to administer the naval stores program under delegation of authority from PMA.

2. Coordination of Agricultural Research Services

All research activities of the department are placed under the supervision of an Assistant Secretary. This assistant secretary will maintain a continuous survey of research and will determine with the secretary such actions, including transfers of functions, as may be necessary and appropriate to insure integration, effectiveness, and economy.

Under the assistant secretary, the chief of the Bureau of Agricultural Economics will be responsible for all economic research and statistical activities of the department and for all cooperative relationships of the department with other economic research agencies and efforts. The administrator of the Agricultural Research Administration will be responsible for all agricultural research other than economic and for all cooperative relationships of the department concerned with such research. The ARA Administrator will also direct and administer, through officers designated by him, the Office of Experiment Stations, department activities in connection with the Research and Marketing Act of 1946, the work of the several research bureaus of the Agricultural Research Administration, and the Agricultural Research Center.

3. Reorientation of Department Agencies for Agricultural Mobilization Purposes

The secretary established the following:

(A) A National Agricultural Mobilization Committee composed of top officials of the department. The secretary will serve as chairman.

(B) An Agricultural Mobilization Policy Board composed of the membership of two existing advisory committees—the Agricultural Research Policy Committee, which was created by the Research and Marketing Act of 1946, and the advisory committee to the Commodity Credit Corporation, created by the CCC Charter Act. Invitations to serve as members will be extended to the Director of Defense Mobilization, the Administrator of Economic Stabilization, and the Director of Price Stabilization.

(C) A State Agricultural Mobilization Committee in each state and territory.

(D) A County Agricultural Mobilization Committee in each agricultural county of the United States and territories.

In general, the new committees will integrate the administration and operational resources of the department so as to meet defense objectives as promptly and efficiently as possible.

The state committee will include the chief officials of department agencies in the state, the members of PMA state committees, and officials of agencies other than the Department of Agriculture who accept the department's invitation to serve. Those invited to serve as members include the State Director of Extension, the Director of the State Agricultural Experiment Station, the State Director of Vocational Agricultural Education, and the State Commissioner, Secretary or Director of Agriculture.

The county committees will include the chief officials of department agencies in the county, members of the PMA county committee, and, by acceptance of invitations, the county agent and a representative of vocational agricultural teachers in the county.

Chairmen of state and county PMA committees will serve as chairmen of the agricultural mobilization committees.

Germination of Noble and Silver Fir Seed on Snow

Seed dissemination after the beginning of snowfall appears to be a factor in seedling establishment for certain Northwest tree species according to observation made last year at the Wind River Experimental Forest. The snow pack often covers the ground before natural seed fall is finished. This is particularly true for western hemlock (*Tsuga heterophylla*) at its higher range, noble fir (*Abies procera*), and Pacific silver fir (*Abies amabilis*), all of which shed the bulk of their seed at a later date than Douglas-fir (*Pseudotsuga taxifolia*). Cones of the western true firs normally shatter early, but pitchy cones and seeds caught in the upturned foliage extend the seed fall throughout the winter months. The beginning of favorable germination conditions in the spring finds some seed of all species scattered throughout the snow pack and perhaps even the bulk of the true fir and western hemlock seed crop imbedded in its lower layers. The question then is, will this seed produce seedlings?

Some observations made in early June 1950 provide a partial answer to this question. Snowbanks 2 to 4 feet deep remaining in the more shaded spots on a timber access road were observed to be thickly covered with seed from the

FIG. 1.—True fir seeds found germinating on snowbanks at 2,800 feet elevation on June 14, 1950.

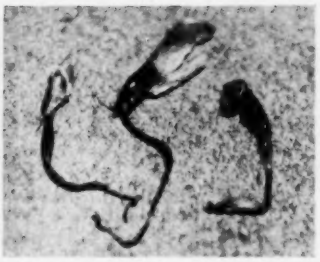

FIG. 2.—True fir seeds which germinated on snow and failed to become established seedlings as the snow melted.

FIG. 3.—True fir seedlings which germinated on snow and established their root tip a short depth into the soil when the snow melted. Note the twisted stem indicating changes of position as the snow melted. There is little chance of their surviving.

previous fall's seed crop. True fir seeds in all stages of germination were found well distributed over these snowbanks. It is significant to note that seeds of Douglas-fir and western hemlock were also found, but they were not germinating.

A common concept exists that conifer seeds require temperatures of 40 degrees F. or above to germinate. However, it is hardly possible that temperatures this high did occur at the surface or slightly below the surface of a slowly melting snowbank lying in the shade on a north slope. Yet many true fir seeds were found with primary roots that had penetrated an inch or two down into the snow. Others with a developed hypocotyl and primary root were found lying horizontally and slightly imbedded in the snow. This indicated that the snow had melted from around the germinating seed and its growing root, and as a consequence the developing seedling had fallen over from lack of support. The root tips of some of these seedlings had changed direction and were growing down into the snow again.

A number of germinating seeds were marked and observed to determine if they would establish themselves in the soil when the snowbank melted out from under them. Only two of these seedlings managed to establish their root tips to a depth of one-fourth inch into the soil. Their stems were very crooked and elongated. The exposure of the stem to the hot summer sun, and the shallow rooting precluded the possibility that even these two seedlings could survive a normal summer. Seedlings that had germinated on bare ground nearby were firmly anchored several inches deep in the soil.

One of the techniques of broadcast sowing of tree seed is to sow on the snow. These findings indicate that this procedure may not always be successful with balsam firs because they may germinate prematurely on top of the snow and fail to produce established seedlings when the snow melts.

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Use of Continuous-Strip Aerial Photographs In Forestry [1]

Foresters learning of the spectacular war-time achievements of continuous-strip aerial photography immediately speculated on its possible application to their own profession. This new aerial photographic technique had given water-depth measurements along landing beaches to within 9 inches. In one instance, the large-scale photographs from the Sonné camera, as it is usually called, revealed an enemy command post when communications wire was seen leading into its carefully camouflaged position. The Sonné camera permitted fast, low-flying military aircraft to make photographs of remarkable detail and clarity on a scale as large as 1/300.

The continuous-strip camera is an adaptation of the old panoramic or circuit camera. The conventional shutter is replaced by a focal plane slit which, with the lens, remains open constantly during photography. The film moves past the slit at a speed proportional to the ground motion of the airplane. Thus at the moment of exposure there is no relative motion between the projected image of an object and the film passing the slit. The resulting photograph is a continuous ribbon picture of the area beneath the plane's line of flight. Stereoscopic pictures are obtained by partitioning the camera's lens turret in two and providing a lens for each half. One lens photographs ahead of the plane and the other to the rear. The two strips so produced are photographed on the same film base; this provides a continuous stereoscopic pair from which parallax difference measurements may be made.

An opportunity to investigate some of the possible forestry applications of this new type photography came when a stereoscopic continuous-strip photograph was made available for study through the courtesy of the U. S. Naval Air Training Center, Pensacola, Fla. The area photographed is in the second-growth, upland longleaf pine type near Brewton in south central Alabama. The scale of the photograph studied ranged from 55 to 64 feet to 1 inch (representative fractions from 1/658 to 1/771).

It was found that present Sonné cameras have several limitations so far as forestry applications are concerned. The chief defects are blurring that results from the differential movement between the upper and lower parts of taller trees with respect to the moving

[1] A master's thesis on this subject was prepared at the School of Forestry and Conservation, University of Michigan, in 1949. Details of the study results can also be supplied by the Southern Forest Experiment Station, New Orleans, La.

camera, and excessive scale variation caused by slight changes in topography and airplane altitude. In spite of the wealth of qualitative detail provided by the picture, photographic measurements of tree heights and crown and stem diameters showed wide variations from actual field data for the identical trees. Cameras with longer focal length will partly overcome blurring and scale variation.

Present equipment can probably be used to advantage in sampling understocked forest areas and large plantations, in site evaluation, in assessing range conditions, and in certain ecological work, provided that the subject photographed is not partly obscured by a tree crown canopy and that the height of the subject does not exceed approximately one-fifth of the airplane's altitude above ground.

A Sonné camera adapted to forestry work would have certain advantages in addition to those resulting from the large scale. More flying weather would be available, because the low plane altitudes possible will permit photography under cloud and haze conditions which would rule out exposures from the greater altitude required in conventional aerial photography. In addition, strip photographs can be made under adverse light conditions with possible exposure time up to ¼ second.

Continuous strip-photographs are unlikely to be practical where complete coverage is needed, for their extremely large scale is achieved at a sacrifice of area coverd per flight strip. It appears, however, that this new technique can be developed as a sampling method capable of supplying more detailed information than that now obtainable from conventional aerial photographs.

ARNOLD L. MIGNERY,
Southern Forest Experiment Station, New Orleans, La.

New Poisons for Undesirable Hardwoods

Eight formulations of 2,4-D and 2,4,5-T (4 percent acid equivalent, in Diesel fuel) were used for deadening blackjack oaks 2 to 10 inches d.b.h. in central Louisiana in May 1950. Following are results in September 1950 for the five methods of application that were compared with standard Ammate treatments:

Notches (cups) at base.—Isopropyl ester of 2,4-D killed 92 percent of the tree crowns without basal sprouting. Butyl ester of 2,4-D killed 82 percent and Ammate 100 percent of the crowns, but with both chemicals 10 percent of the trees sprouted from the base.

Frills.—All new chemicals except butyl ester of 2,4,5-T effected a 100 percent crown kill; a 19.3 percent solution of Ammate gave 85 percent crown kill. All new chemicals prevented basal sprouts better than 19.3 percent Ammate did. No trees sprouted when treated with amine salt or isopropyl ester of 2,4-D, and only 10 percent sprouted with butyl ether ester of 2,4,5-T, amine salt of 2,4,5-T, and butyl ether ester of 2,4-D. Although more effective in frills than Ammate, the newly tested chemicals were also more expensive.

Stumps.—The chemicals that prevented sprouting from freshly cut stumps were: Ammate butyl ether ester of 2,4-D, isopropyl ester of 2,4-D, and a mixture of equal parts of butoxy esters of 2,4-D and 2,4,5-T.

Cornell tool.—Injections were made 4 inches apart around the base of the tree. The butyl ether ester of either 2,4-D or 2,4,5-T killed all trees without sprouting. The isopropyl ester of 2,4-D gave a 95 percent crown kill with no sprouts. The other chemicals were less effective. Applying the butyl ether ester of 2,4-D costs about the same as applying a 32.4 percent solution of Ammate in frills—about 1.5 cents for a tree 5 inches d.b.h.

Trunk spray.—The lower 18 inches of the tree trunk was barely saturated. The following chemicals killed 96 to 100 percent of the tree crowns with no basal sprouting: butyl ether ester of 2,4,5-T, isopropyl ester of 2,4,D, and a mixture of equal parts of butyl ether ester of 2,4-D and 2,4,5-T. The first two chemicals were as effective as Ammate crystals applied in cups, but were more expensive, costing about 3 cents for a tree 5 inches in d.b.h.

In general, isopropyl ester of 2,4-D gave the most consistent and effective results, but none of the new chemicals or methods are being recommended until pilot tests are conducted and more reliable cost data are available.

FRED A. PEEVY,
Southern Forest Experiment Station.

We Present

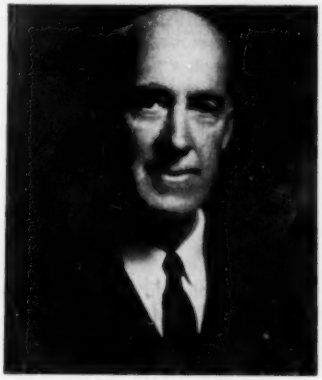
John H. Foster

John Foster, who recently retired as state forester of New Hampshire, was recognized throughout the country as the dean of state foresters. He deserved this title not merely by reason of length of service but because of his example of faithful service to conservation, his trusted and proven judgment, and unselfish devotion to the public good. On the eve of his retirement, on February 28, 1951, more than one hundred friends and colleagues, including Governor Sherman Adams, met to honor him at a testimonial dinner.

John Harold Foster was born April 13, 1880 in Waltham, Mass., where he passed his boyhood, and attended the Waltham High School. His father, John Foster, was born in Marlow, N. H. Just when the love of hills, streams, and woodlands became his dominant passion is unknown, but certainly it was nourished during his college years spent at Norwich University in Vermont, as evidenced by the prodigious cross-country walks he made while there. During his residence at Norwich, he became a first lieutenant in the Vermont National Guard. Graduating with the B.S. degree in 1903, he attended Massachusetts Institute of Technology during 1903-1904; from 1904 to 1905 he studied in Europe and taught at Lawrence Academy, Groton, Mass.

Then entering the Yale Forest School, he received the M.F. degree in 1907 along with such other stalwarts of the profession as Ovid Butler, S. T. Dana, and Clyde Martin. He has served continuously as secretary of the Class of 1907. Like most foresters of the period he entered the U. S. Forest Service in 1907 and was attached to the Washington office, working under Raphael Zon and J. Girvin Peters, and later becoming assistant chief of state and private cooperation, where his duties included inspecting the results of cooperation in fire protection with the states.

His career in the Forest Service gave him a background of varied experience that was later to prove of value in his state work. He examined forest conditions in the East, South, and West, as evidenced by his publications *Engelmann Spruce in the Rocky Mountains* and *Cutover Lands in Mississippi*, circulars of the Forest Service; *Forest Conditions in*



JOHN H. FOSTER

Louisiana, issued by the Louisiana Forestry Commission; *Forest Conditions in Southwestern Mississippi*, issued by the Mississippi Geological Survey; and *Watershed Survey of the Alleghany and Monongahela Rivers*, issued by the Pittsburgh Flood Commission.

An assignment during his early years with the Forest Service that was to have special significance later was a study of forest taxation in New Hampshire. Forest conditions in northern New Hampshire had been the subject of a special study by Alfred K. Chittenden, published in the 1903-1904 report of the New Hampshire Forestry Commission and as a Forest Service bulletin. The situation in southern New Hampshire had been similarly treated by Lyford and Margolin in the Commission report of 1905-1906. In 1906 the famous railroad tax case was before the courts and a topic of public discussion in the state generally. The Boston and Maine Railroad brought suit for abatement, claiming disproportional assessment. It is interesting to observe in passing that this claim was sustained because it was proven that other property was underassessed as compared to railroad property, and it was for the purpose of bringing all other property up to full assessment that the State Tax Commission was established in 1911. In order to prepare this case the railroad employed a number of able property appraisers. The examinations included forest property among other kinds. The subject of taxation was a hot issue in New Hampshire from 1906 on.

About this time the New Hampshire Forestry Commission decided to have a careful study made throughout the state of the forest tax situation. It sought the help of the U. S. Forest Service, and Mr. Foster was detailed to make this study for New Hampshire. He spent a great deal of time and examined hundreds of pieces of property all over the state. His report was consummate. It constituted the bulk of the report of the Forestry Commission for 1907-1908. In proposing a yield tax, Foster wrote (September 1908), "The fundamental difficulty is that the tax should be in proportion to yield or income and not in proportion to market value." Little did he realize he would live to see this concept enacted into law in New Hampshire. The statute he proposed in his report provided for optional classification; while not acceptable at the time, such a law was later enacted. Foster's study and presentation of the facts regarding forest taxation were, however, accepted as an extremely valuable contribution. The study came at the right time, and helped to further the settlement of the law suit and the establishment of the Tax Commission. It laid the foundation for the present New Hampshire timber tax law.

In 1911, Foster left federal service and was appointed the first professor of forestry at New Hampshire College, as the university was then called, and extension forester at the experiment station. Here he published two bulletins *Care of Farm Woodlots* and *Marketing White Pine in New Hampshire*. He remained until 1915 when he accepted a call to be the first state forester of Texas and professor at Texas A & M College. Here he laid the foundations for what is now the Texas Forest Service. In 1918 he served with the U. S. Fuel Administration for a period near the close of World War I. At this time it became necessary for him to return to Waterville, N. H. to settle an estate, and for a time he operated the Waterville Inn.

When Edgar C. Hirst resigned as state forester of New Hampshire, Foster probably did not need much urging to accept the position. It fitted him and he fitted it immediately. He took office April 1, 1920 and served continuously in that capacity for thirty-one years.

When he took office as state forester, a beginning had been made in fire protection, reforestation, and acquisition of state forests. The major developments in state forestry have occurred during his administration. The Clarke-McNary Act and subsequent cooperative projects, the advent of C.C.C., and the timber salvage operations following the 1938 New England Hurricane, all received his wise guidance. The acquisition by the state in 1927 of Franconia Notch and of many other scenic areas focused attention on the growing interest in forest recreation. Foster planned the initial development of many of the bathing beaches and other present state parks. These were later improved with the aid of the C.C.C. and the work expanded until a separate division was established to handle this important part of the Forestry and Recreation Commission's activity. More recently, Foster has taken a leading part in the formation of the Northeastern Forest Fire Protection Compact, and the passage of the act for Conservation and Taxation, whereby standing timber is exempted from annual taxation and is assessed a severance tax when cut.

Married in 1915 to Mary Elliott of Waterville, N. H., who died in 1918 following the birth of their second child. In 1922, he married Helen Clark Kelley of Arlington, Mass., who had been similarly left with two small children. Together they have brought up and given college educations to these four and one more of their family of five. All the children are now married and have carved out careers to their own liking. There are now nine grandchildren. The oldest son, Elliott, is a surgeon in Keene, N. H.; Robert is with the General Electric Company in Schenectady, N. Y. and John is a geologist for the State of Illinois at Urbana. All three served in World War II.

Foster is a member of Theta Chi and Alpha Zeta fraternities, a 32nd degree Mason, and a member of many forestry societies. He has been a Member of the Society of American Foresters since 1910, and was a member of the former Eastern Foresters Association. He also is a member of the American Forestry Association, the Society for Protection of New Hampshire Forests, the New Hampshire Academy of Science, and Appalachian Mountain Club. He is a Unitarian and a Republican. His home is at 47 Auburn Street, Concord, N. H.

His public service has not been limited to the state forester's office. He was a member of the New Hampshire Constitutional Convention in 1919, and for many years has been a selectman of the Town of Waterville where he still maintains legal residence. He has ably administered the affairs of the small town, which is a model for town financing. A certificate of merit was recently awarded him in recognition of services rendered in connection with the Selective Service System during World War II. Darthmouth College awarded him an honorary M.A. degree in 1940.

Foster loves people. His smile radiates friendliness and warmth. Many a young man seeking a job, or perhaps only advice, has found himself the center of the state forester's rapt attention while business waited and important dignitaries cooled their heels outside. Naturally, he has hosts of friends in every hamlet in the state, and this popularity was recognized in 1944 when he was elected district governor of Rotary Clubs so that during one year Vermont and part of Quebec also shared his services and geniality. Naturally, much of his success in winning support for unpopular legislation and appropriations stems from his obvious sincerity, honesty, and complete lack of selfish ambition.

John loves trees and forests. When he gets out in the woods, the cares and worries of office responsibility vanish, his face beams with enjoyment of the growing things about him, and his step is light and springy. He knows the woods and has tramped the forest trails, especially in the White Mountains.

He also loves his work. Old associates can scarcely recall a day when he has been absent on account of illness. He is at his desk until late every day, and frequently spends weekends at work as well. But he loves play, and is one of the most happy men alive. For many years he maintained his own tennis court and played daily with his boys until he was no longer in their class.

Dr. Richard Cabot once wrote a book entitled *What Men Live By* and enumerated work, play, love, and worship as some of the leading forces guiding men's ambitions. John Foster is a good example of this rule of life, for all have played a major role in his career.

New Hampshire, with 82 percent of its land area in forests, has been fortunate in having John Foster as a leader in the conservation of its natural resources. Both he and the giant pine that has weathered many storms have much in common. Now on his retirement he must take satisfaction in the progress made, as do his many friends, who offer their heartiest congratulations.

HENRY I. BALDWIN

Reviews

An Introduction to the Anatomy of Seed Plants.

Ernest L. Stover. 274 pp. Illus. D. C. Heath and Company, Boston 16, Mass. 1951. $4.

Textbooks are getting thicker by the year and it is good to see one of moderate size. Perhaps that is what "introduction" should mean. This book, which is a first edition, treats the anatomy of roots, stems, and leaves of the seed plants. Plant embryos and their development are included but flowers, fruits, and seeds are beyond the scope of the book.

The traditional "logical" progression through the various plant groups in evolutionary order is not followed. Instead, it is refreshing to find the whole discussion arranged around a functional approach. Three of the most important chapters deal with the structure of leaves of gymnosperms and angiosperms. It is encouraging to see that leaves are divided ecologically into xeromorphic, mesomorphic, and hydromorphic. The plants selected to illustrate anatomical types are natives or common introductions.

The manner of making citations to literature is not uniform. Usually the last name of the author is given in the text, followed by the name, volume, and year of the publication. Sometimes only an author's name appears in the discussion. The most important references are given in complete form at the close of the chapters. On page 52 the 1929 edition of Weaver and Clements' *Plant Ecology* is mentioned. But on page 129 their 1938 edition is listed, although Clements name is omitted. In an effort to be up to date, one book "in press" is included.

Foresters will be interested that three chapters are concerned with wood. The last chapter is a key for identification of 69 genera of woody plants by means of thin freehand sections. Another very appealing and practical part is the chapter on vegetative propagation. It becomes an application of the fundamental points presented in earlier chapters.

There are 149 figures, many of which are excellent photomicrographs. Most of the figures are explained by a system of labels with line pointers indicating the structure or part being named. There is an index to "structures and processes" (pages with illustrations in boldface) and a separate index to plant names. However, author's names are not given in either.

This book is a good general discussion of plant anatomy with applications to wood technology and propagation.

PAUL C. LEMON,
N. Y. State College for Teachers.

Status and Fiscal Significance of Federal Lands in the Eleven Western States.

By Committee on Tax Education and School Finance. 207 pp. Multilithed. National Education Association of the United States, Washington 6, D. C. 1950. $1.

The problem of how federally owned real estate can bear its fair share of state and local government costs is real and significant. It is receiving considerable attention in public land states of the West and in Congress. Further, it is becoming more pressing and complicated because of constant expansion of federal projects.

Many matters relating to the problem are discussed in the report, with emphasis upon the relation of federal ownership to the taxing effectiveness of state and local governments. Thus it is most timely and will be of direct benefit to many. It presents the findings of a study made by the committee on tax education and school finance. Compilation of the facts and the drafting of the report were done by Jewell J. Rasmussen of the University of Utah. The research division of the National Education Association administered the survey and edited the report.

Four aspects receive specific attention (a) "an inventory of federally owned real estate by counties, wherever possible," (b) "a determination of the amount of taxes that would be payable if federally owned real estate were subject to state and local taxation," (c) "a summary of all revenue received by states and counties that might be regarded as equivalent of payments in lieu of taxes," and (d) "a brief analysis of the question of federal versus state and/or private ownership of public lands." An overall anlysis is made first and is followed by a detailed study separately for each of the eleven western states. Finally, conclusion and recommendations are given. Included also are statements from selected national associations. Land is the important type of federal ownership; therefore, it receives the most attention. However the report covers other federal real estate, which makes the title misleading.

The publication presents data, analyses, and conclusions that can be of value in developing sound, comprehensive, and consistent federal fiscal policies. Using this information, state and local governments can determine the extent of federal ownership and the effects upon property tax revenue and service requirements of such ownership. Since there are some 15 federal agencies with varying degrees of local influence involved, this report can be of great value in analyzing local situations. This is important and necessary since the impact of federal activities is not uniform but varies from insignificance in some communities to major dominance in others. A situation like this has arisen not only because of unequal distribution of federal ownership but because arrangements for "in lieu" payments are not the result of a comprehensive and consistent policy but rather the result of expediency and compromise.

The data used in the analyses are for the most part reliable and are the best available. However, since they have been gathered from many sources, some are not directly comparable. This is particularly true in the determination of the amount of taxes that would be payable if federally owned real estate were subject to state and local taxation.

Conclusions and recommendations are not final. They consist of possible solutions to the many problems arising because of the varied conditions of federal ownership. It is pointed out that this report "is not an official statement of policy either of the Committee or of the National Education Association." From the facts obtained in this report they expect to prepare a statement of policy at some later date.

More detailed study is required before final guides for tax reform can be written. Such a need follows naturally from the complexity of the problem presented by the numerous and complicated factors affecting federal ownership and the resulting impact on individual communities. The writer of this review has followed the public reaction to the recently proposed change for federal payments from national forests. This proposal would change the method of contribution from 25 percent of the gross receipts to 2 percent of the valuation. (A similar recommendation is offered in this report.) The reactions have been varied depending upon the effect of such a change on local situations. Thus it is necessary to weigh the public response to every suggested change before fair and acceptable policies can be made.

Federal ownership is public ownership; thus the attending problems can be solved only by an enlightened public willing to compromise opposing interests. To provide such enlightenment is the primary purpose of this publication. Because it is written in nontechnical language, is readily readable, and well organized, it is felt that this objective will be realized. It presents the best up-to-date information available and should result in a wider knowledge and better understanding of the problems of federal ownership of property and related fiscal problems.

ERNEST WOHLETZ,
University of Idaho.

The Forester on the Job.

By Walter F. McCulloch, 105 pp. The Cooperative Association, Oregon State College, Corvallis, Oreg. 1950. $1.75.

The Forester on the Job fills a need of long standing, that of presenting to foresters, prior to their first jobs, the essentials of personnel relations, both up and down the organization chart. Walter F. McCulloch spent many years gathering from first-hand observation the material that went into this book. It was written specifically to develop supervisory ability in forestry students. Others will enjoy reading it, too, for it is loaded with realism and replete with McCullochisms. The basic information gathered from men on jobs and from employers of foresters has been so carefully distilled that practically every sentence in the book is a bit of wisdom that one could frame and hang on the wall.

The book is divided into two major parts, one in which the development of the individual is discussed, and the other in which the principles of effective supervision are outlined.

It would be difficult to select the best parts of the book, but some of special interest include those on creative thinking, the use of time, responsibility, the relationship of ambition to ability, characteristics of leadership, motivation, relations with subordinates and superiors, and job planning.

The Forester on the Job is not merely a treatise on personnel management; it is a guide to assist a graduate of a "curriculum festooned with ring-porus woods, l.op", and solar observations" in developing "the attributes needed in later, more important positions."

ROBERT D. HOSTETTER,
Society of American Foresters.

Ecology and Silviculture of White Cedar and Associated Hardwoods in Southern New Jersey.

By Silas Little, Jr. 103 pp. Illus. Bulletin 56, Yale University School of Forestry, New Haven, Conn. 1950. $1.50.

This bulletin is the result of very intensive studies and is a must for each forester concerned with the management of southern white cedar (*Chamaecyparis thyoides*). As the list of 125 references indicate, the author has made a complete review of the literature dealing with white cedar. This information has been used most advantageously; both in guiding the study and in the final conclusions. The final result presents all the available factual data necessary for the successful management of white cedar.

The purpose of this bulletin as stated by the author is "to present additional information on the ecology and silviculture of the swamp forests of southern New Jersey." This purpose has been accomplished, but I do not think the results and conclusions apply to New Jersey alone. I am quite sure they can be applied to white cedar stands throughout its natural range.

Of particular significance is the treatment of associated hardwoods and the inter-relation between those species and white cedar. Many cedar sites are now occupied by the associated species which have little value. These sites should be converted back to cedar. The silvical habits and ecological relations of both cedar and hardwoods have been given thorough study and the results point the way for the forester to adopt better management practices.

The historical and geographical information relating to the distribution and use of species under discussion is both enlightening and interesting. Covering a period starting with early colonial times up to the present day, it presents a picture of conditions then and now.

The portion of this bulletin dealing with silviculture presents the complete story as it exists today.

Clear-cutting by progressive strips whose widths are from 100-150 feet is an established and workable practice but, as emphasized by the author, the slash must be burned if reproduction is to be secured.

This bulletin reports the results of a thorough study. Investigations have been made of details which until this time were mostly observations. Since white cedar is one of our most valuable trees facutal data on its ecology and silviculture, along with that of the associated species, is a vital necessity to the forester. This bulletin makes that information available.

GEORGE R. MOORHEAD,
New Jersey Department Conservation and Economic Development.

Taxation of Crown-Granted Timberlands in British Columbia.

By Lowell Besley. 86 pp. Illus. Faculty of Forestry, University of British Columbia, Vancouver, B. C.

This excellent work is a comprehensive analysis of past and present taxation of Crown-granted timberlands and wild land in British Columbia.

As background material the author points out that in 1945 the Royal Commission on Forestry estimated that fully 40 cents out of every dollar of government revenue came directly or indirectly from British Columbia's forests. He also reports on the ownership pattern of the 75,023,000 acres of productive forest land in British Columbia. Only 7 percent, or 5,175,000 acres, is Crown-granted, which is the term designating private ownership; whereas 93 percent, or 69,848,000 acres, is held under Crown or public ownership.

Present taxes on Crown-granted timberlands in British Columbia consist of a property tax amounting to 3 percent of the assessed value on wild or cut-over lands, and 11/2 percent on timberland properties, plus appropriate school taxes, and a 6-cent per acre forest protection tax. Further analysis showed, for instance, that in the period 1931-1940 timberland represented only 9 percent of the total rural land area, and only 15 percent of the assessed value, but paid 17 percent of the taxes. This high tax is because of higher assessed value per acre and a higher rate of taxation.

The report shows that the total tax per timber acre rose 154 percent during the period 1930-1948. Average tax per timbered acre in 1949 was nearly $2.

The study concludes by proving by given examples that the present high annual taxes on Crown-granted timberlands in British Columbia practically make it mandatory for an owner to liquidate his holdings as quickly as possible, and allow the land to revert back to the Crown. In effect, this means that proper forest practices, designed to bring about sustained yield operations, have not been economically feasible on private lands due to high taxation.

As an aftermath to this report, and as a sign of progress, it is to be noted that an amendment to the Taxation Act is to be introduced at the present session of the British Columbia legislature, which will make financially possible "tree farming" on cutover lands only.

ROBERT D. SCHULTZ,
Vancouver, B. C.

Northern Coniferous Forest Soils

By Olaf Tamm. (Translated from the Swedish by Mark L. Anderson.) 253 pp. Illus. The Scrivner Press, Oxford. 1950. 17*s.* 6*d.*

This book is written not for the soils specialist but for the practicing general forester who will be well rewarded by reading it. It is true that the book deals with Swedish forests and forest conditions. Nevertheless, the practicing forester in this country can find much that is directly applicable to forestry in our northern coniferous region.

The sixteen chapters move in logical sequence from the general demands of the forest on the locality through the various climatic factors; mineral and organic constituents of the soil, weathering, mull and mor formation, peat soils, soil productivity, and practical forest soil classification.

Of particular interest is the chapter on podsolization. Here the author stresses the underlying causes of podsol formation such as climate, sub stratum, water content of the soil, age of the soil, and the stand present. One gathers the impression that silvicultural methods can control podsol formation only through its effect on mor formation, since climate and soil are not changeable. The thicker and more inactive the mor, the greater the podsolization in any given region.

The discussion on mull and mor and their significance has much of interest to the practicing silviculturist. It is through the effect of these operations that the forester can influence soil conditions in the forest. Speaking of clear felling with burning in the vaccinium spruce-forests with some admixture of pine, the author says, "It [clear felling with burning] is to be regarded as the most natural method in the sense that, more than any other method, it resembles the way in which nature herself regenerates such forests, and it should be resorted to where experience shows that good regeneration is not likely to be had with milder methods or required a length of time which can be counted in decades." This may possibly hold true for some of our American types such as jack pine or red pine. The beneficial effect of the fire lies in the fact that humus covering is stimulated. The author admits that in climatically severe districts there are rich soils where the humus covering does not require burning for stimulation.

An indirect effect of burning is the subsequent increase in the amount of birch in the resulting stand. This has a stimulating effect on the resulting mor in pine stands. In many Swedish pine forests birch is encouraged even though it has no economic value.

Site quality and its permanence is ably discussed and the reader draws his own conclusions whether to follow the theories of the Danish forester, P. E. Müller, who believes that site quality can be

changed through silviculture, or the theories of the Finnish forester, A. J. Cajander, who believes that site qualities are fixed and immutable.

The book is one which should be available to all practicing foresters. It should serve to stimulate studies in the practical application of silviculture in our northern coniferous forests.

T. SCHANTZ-HANSEN,
University of Minnesota.

Report to the People of Wisconsin on Cover Destruction, Habitat Improvement and Watershed Problems of the State in 1950.

Wisconsin Conservation Bulletin. 78 pp. Illus. Wisconsin Conservation Department, Madison. Vol. 16, No. 2, February 1951.

As far as is known, this bulletin represents the first attempt of a state to assess its watershed problems and publish the results. Certainly it is the first attempt to do this on an annual basis—a most ambitious undertaking — drawing up, in effect, a balance sheet of watershed activities. Debited are those practices that destroy natural cover, erode soil, silt streams, and swell flood runoff. Credited are conservation practices that tend to stabilize the cover, soil, and stream flow. In this refreshing approach the Wisconsin Conservation Department does not beat the drum for forest management or wildlife management (although this is one of the principal concerns) or soil conservation. Rather it recognizes that watershed management involves "all aspects of the productive and protective use of land and water."

To set the stage the bulletin opens with a review of the literature describing watershed condition and land use in the past with the paraphrase-resistant thought that "Only through a clear understanding and recognition of those things which we have already lost can we fully appreciate the importance of that which we are losing daily, little by little, without fully realizing our loss." First reviewed is a book published by the state in 1867 under the definitive title *Report on the Disastrous Effects of the Destruction of Forest Trees Now Going on So Rapidly in the State of Wisconsin.* More recent references include a description of how cover changes have affected flow from one stream as seen through the eyes of C. F. Evans, president of the Society, who spent his early years in Wisconsin.

Problems of erosion, water, and cover are discussed in the section on cover and habitat destruction in 1950. Strongly brought out is the woodland grazing problem. One can sense the frustration of the conservationists who prepared this bulletin when they align statements such as "Any woodlot that is grazed is overgrazed as far as good timber production or wildlife production is concerned" against the fact that 72 percent of woodland on farms is grazed.

Also on the debit side of the ledger are cited several conflicts in land use, for instance, drainage for agriculture reducing wildlife habitat areas, roadside spraying with herbicides (1,800 miles of roadway sprayed in 1950) having the same effect, and road construction destroying scenic values. An accounting is also made of the marsh and wood fires, tree diseases, and windfall during the year.

On the credit side is listed the work of federal and state conservation agencies, and of conservation clubs. The report shows that very substantial progress was made during the year in all fields of conservation. Nevertheless, the Conservation Department believes it is operating on the debit side of the ledger. Needed are stronger coordination of conservation activities, adequate finances, and leadership to carry through a watershed program (though it is apparent there is no real deficiency in this last requisite).

Specific recommendations for carrying out a program include a recognition of the multiple-purpose nature of watershed programs and the social nature of watershed problems, the need for ecological research, and legislation to assure coordinated action of all state agencies. In stressing the custodial responsibilities of ownership, reference is made to the recent masterpiece of understatement from the U. S. Supreme Court, "We do not think a state is required under the Constitution of the United States to stand idly by while its natural resources are depleted. . . ." Certainly, from the material contained in this bulletin, Wisconsin's Conservation Department is not standing idly by.

HOWARD W. LULL,
U. S. Forest Service.

Conservation Education in American Schools.

The American Association of School Administrators, Twenty-ninth Yearbook. 527 pages. Illus. Washington 6, D. C. 1951. $4.

To professional conservationists and conservation-minded educators, the appearance of this publication marks an important milestone in a program for integrating conservation ideas and practices in the pattern of general education. The Yearbook, the product of the Commission on Conservation Education in American Schools, seven of whose nine members are school administrators, calls upon the membership of the association to take the lead through the schools in developing a nation-wide program for teaching conservation. With the interest, understanding, and influence of this group which controls the trends of educational policies in its member schools, and the cooperative assistance of professional conservationists in planning organizational details, a wise resource-use philosophy should become a dominant factor in American education.

A glance at the membership roster of the association—a state-by-state, closely printed alphabetical list covering 191 pages of the 527-page volume—catches the imagination of the reader with its tremendous possibilities *when and if* the Yearbook's proposals move down to the grass roots and develop classroom and extra-curricular

practices in conservation education. Culturally speaking, in terms of salvaging the good from the past, saving the best from the present, and looking hopefully toward a better future, American schools are the greatest conservation agencies we have had. Under the leadership of administrators, alert to the need for developing a national program in conservation education, they can be, also, the agencies through which will be built an understanding of sound resources use without which our American way cannot endure.

In the Yearbook, the commission proposes the following policies: (1) programs should deal with all natural resources and their relationships, (2) programs should be based upon broad scientific and social concepts, (3) programs should start at the community level, then develop into a study of state, regional, national, and international conservation needs, (4) such study should be correlated with the prevailing curriculum, and should be presented at all instructional levels in both rural and urban schools, with new materials adapted to local communities developed by them, (5) wherever practical, classroom instructions should be accompanied by outdoor educational experiences, (6) schools should cooperate with governmental and non-governmental agencies concerned with resource use, (7) schools should set up in-service courses in conservation education, and (8) teacher training institutions should make conservation education their special concern for pre-service and in-service teachers.

The ten chapters of the Yearbook are intended to implement the commission's proposals. After developing the idea that conservation is the price of survival, and devoting a chapter to the historical aspects of American conservation, the publication proceeds to indicate instructional materials and facilities, good practices in rural and urban schools, promising state and regional programs, pre-service education for teachers, and ends with a chapter on administrative leadership. Three well prepared appendices complete the text: one on bibliographic materials covering basic references, those on how to teach conservation, and references graded for different school levels; the second, a fine, annotated list of audio-visual aids; and, the third, an annotated list of organizations and agencies concerned with conservation.

In the words of the commission, the Yearbook "is not a textbook on conservation, or a compendium of technical information about conservation practices — rather, it is an administrator's guide, which defines a broad area of school responsibility and indicates what can be done about it." As such, it commends itself not only to school administrators, but to all others interested in providing a vital and far-reaching conservation education program as a means of bridging the gap between a resource-rich America and a possible resource-limited one.

JOHN F. LEWIS,
State Teachers College, California, Penna.

Plant Pathology.

By John C. Walker. 699 pp. Illus. McGraw-Hill Book Company, New York. 1950. $7.50.

This is a well-organized text book, which begins with definitions of plant pathology and the many terms peculiar to the subject. To those not specializing in the field, the second chapter dealing with the history of plant pathology should be interesting. The controversy surrounding the question of spontaneous generation versus the germ theory may be fascinating to all who have not heard it before. This controversy was also closely tied up with early development in the biological sciences, and is of interest to us all.

The next ten chapters are arranged according to the different classes of diseases, starting with No. 3 on nonparasitic factors such as adverse temperatures, light, soil moisture, soil nutrients, and injury by lightning. Chapter 4 is on bacterial diseases and chapters 5 to 9 inclusive deal with the various groups of fungus diseases starting with Plasmodiophorales, Phycomycetes, Fungi Imperfecti, Ascomycetes, and Basidiomycetes. Each of these chapters takes up a few outstanding diseases representing the particular group of organisms involved. Each disease is uniformly presented with an introductory statement of the history of the disease, plants affected, symptoms, causal organism, disease cycle, varietal susceptibility, control, and a list of important literature references. There are in most cases two or more illustrations for each disease, usually with one (probably a photograph) showing a diseased plant or diseased parts and the others simple drawings of fruiting stages of the organism.

Chapter 10 is a short one on diseases incited by Phanerogamic parasites including true mistletoes, a dwarf mistletoe, and dodder. Chapter 11 is another short one on diseases caused by nematodes and 12 is a long one on virus diseases. This latter includes common symptoms, effects, transmission, and properties as well as an outline of development of concepts of the nature of viruses, followed by 9 examples of important virus diseases.

Chapter 13 deals with the relation of environment to disease development and chapter 14 is on interaction between host and parasite. The last three chapters are on disease control, with chapter 15 on control by keeping disease organisms away from the plants (exclusion and eradication); No. 16 by protection through spraying or control of cultural practices, handling practices, etc.; and the last one on control through host resistance.

Of the chapters dealing with specific diseases, perhaps chapter 8 on diseases caused by Ascomycetes and 9 on diseases caused by Basidiomycetes are of most interest to foresters. The former includes several typical leaf diseases as well as chestnut blight and Dutch elm disease. Chapter 9 includes a cedar-apple rust, white pine blister rust, Rhizoctonia diseases, white rot of deciduous trees, and Armillaria root rot. Chapter 12, on virus diseases, includes no examples on shade or forest trees.

The book is outstanding in its simple and uniform presentation, its excellent and well reproduced illustrations, and its rather extensive historical reviews. The numerous references give the student an opportunity for obtaining more complete information.

ROSS W. DAVIDSON,
Division of Forest Pathology, U.S.D.A.

Planning a National Forest Inventory.

By J. D. B. Harrison. 88 pp. Food and Agriculture Organization of the United Nations, Washington, D. C. 1950. $1.

This book is not intended for the inner circle of such smooth running projects as the U. S. forest survey or the national forest survey of Sweden with their batteries of electronic machines which measure and calculate growth cores, but rather for foresters in far away places who are trying to build a forest inventory on a shoestring of know-how and finances. For these frontiersmen of the forestry scene it will provide a good statement of general principles they must not lose sight of and a digest of the best current procedures for carrying out a national forest inventory.

The Food and Agriculture Organization looks to forest crops equally with field crops as means of bringing the world's peoples that most basic of the Four Freedoms —freedom from want. Results of their initial world forest inventory carried out in 1947 showed that to meet the world's full needs better forest practices must be instituted in many quarters, forest destruction ended, and, finally, production encouraged in many underdeveloped and presently inaccessible areas. A logical first step is a broad forest inventory of these areas.

Mr. Harrison stresses the things which any national inventory must find out—the forested area of a country, timber volumes, ownership of forest land, and estimates of growth and drain. He writes with a knowledge of the practical difficulties foresters may have in getting funds and continuity of purpose from their governments. He suggests the means by which the vital information may be obtained at low cost—making unit areas large and processing with maps, leaving certain phases of the project for later attention. He distinguishes clearly between the nature and purposes of a national survey as opposed to a working plan survey.

His coverage is very complete, ranging from the planning and taking of the air photos to the preparation of final reports. Naturally there is not too great detail on any one of the many subjects treated, such as photo interpretation, stratified sampling, studies of growth. His statements are generally sound and trustworthy. References are provided for fuller treatment of most points.

This book is a good example of the sort of assistance which can be lent by the United Nations to underdeveloped countries. It should be required reading for governmental authorities as well as foresters in such countries. To the general reader it suggests in a fresh way the diversity of the forests of the world and yet the fact that a concept of One Forest is emerging to take its place in One World.

MARSHALL N. PALLEY,
Saskatchewan Forestry Branch.

A Research on the Regeneration of Birch in South Finland.

By Risto Sarvas. 91 pp. Illus. Metsatieteellisen Tutkimoslaitoksen Julkaisuja 35(4). Forest Research Institute, Helsinki, Finland. 1948.

This comprehensive and well-illustrated publication gives the results of a survey of 135 sample plots in southern Finland, to study regeneration by seed of two north European birch species, *Betula verrucosa* and *Betula pubescens*. Its results should be of especial interest to foresters in the Lake States, northeastern United States, and eastern Canada.

The plots examined were in ungrazed areas handled by group selection, shelterwood, and clear-cutting methods as well as in stands originating on old forest burns, and tracts burned over for crop production. Points receiving special emphasis in the study were periodicity of seed years, quantity of seed produced, its germinative capacity, distance the seed is spread by wind, and effect of site factors on regeneration.

B. verrucosa produces a fairly good crop (amounting to one-fifth or more of that in the best seed years) only every third year. Intervening crops may be only 5 to 10 percent of a heavy crop. Since very favorable seedbed conditions on regeneration areas last for only one or two years after cutting or burning, the occurrence of good seed years is a factor to consider in successful regeneration. In good seed years, birch may produce a huge quantity of seed—the best observed being 128 kilograms per hectare (114 pounds per acre). This exceeds Scotch pine or Norway spruce maxima. However, in the cutting areas examined, there was an estimated average of 0.8 kilograms of seed per hectare (0.714 pound per acre) representing some 340 filled seeds per square meter (about 1.36 million seeds per acre).

An estimated production of less than 100 filled seeds per square meter occurred in 10 percent of the plots in clear-cut areas, 36 percent in seed tree areas, and 18 percent in group selection tracts.

Sarvas considers that at least 100 filled seeds must fall per square meter (400 per mil-acre) to assure abundant regeneration. In practical terms, this requires leaving at least 4 to 8 large-crowned, well-spaced, birch seed trees of sawlog-size per hectare (2 to 3 trees per acre) or a correspondingly larger number of smaller trees or rather good crown development and vigor.

Germination of *B. verrucosa* ranged from 61 percent in the south to 53 percent in central Finland, while *B. pubescens* was 63 and 70 percent respectively in these two regions.

As regards distance of spread of birch seed, the present work

verifies that of Heikinheimo, who in 1944 set a figure of about two tree-heights as the practicable distance of good seeding from a forest border of birch. Sarvas states that there have been exaggerated views as to the distances that the species will seed with consequent errors in judgment as regards the number, spacing, and size of seed trees left for regeneration. He found the rate of fall of seed of *B. pubescens* and *B. verrucosa* to be 0.52 and 0.69 meters per second respectively, while for Scotch pine it was 0.65.

The abundance of birch seed produced is offset by factors of a very low food reserve; for birch it is only 4 percent of that of Scotch pine by weight. The pine, hence, has greater ability to push its radicle through the drier surface humus layers to tap moister substrates than does birch. Hence, mortality in the latter is high. Birch regenerates best in good sunlight in recent burns, in areas where mineral soil has been freshly exposed, and in moist hollows or swampy lands. *B. pubescens* seems to be especially well adapted to the moist sites.

The average number of seedlings per hectare ranged from 122 on the dry upland *Calluna* type to 38,553 on ordinary wet spruce-hardwoods, peat-moor areas, or in a ratio of 316 to 1 in favor of the moist sites. Stocking on other vegetation types was intermediate between these two extremes.

The present tendency in Finland is for birch to be decreasing in amount because less burning is practiced than formerly in connection with land clearing and agriculture. On upland soils, only special measures such as clear-cutting and controlled burning or exposure of mineral soil, along with direct seeding under certain circumstances, will assure a stand with a high percent of birch, and avoid its gradual succession by spruce. There, group selection methods offer much more possibility, than ordinary diameter limit cuts, of keeping a fairly good representation of high-quality *B. verrucosa* in the forests of Finland, needed to supply industries depending on it as a source of raw material for veneer and furniture manufacture.

J. H. STOECKELER,
Lake States Forest Experiment Station.

Land Hunger in Mexico.

By Tom Gill. 86 pp. Charles Lathrop Pack Forestry Foundation, Washington 6, D. C. 1951.

Tom Gill, official of the Charles Lathrop Pack Forestry Foundation and veteran student of resource problems in Latin America, gives here a powerful, compact, and thoroughly understanding account of a desperate situation. However deeply one may be concerned about conditions in the United States, he is bound to feel abashed when confronted with the plight of our Mexican neighbors, as a man might be who catches himself complaining of a cramped muscle in the presence of another who has just lost an arm.

Most of Mexico is high, rough, and arid. More than twenty million people live on little more than three-quarters of a million square miles, of which only seven percent is crop-land. Pressure on soil, forests, and water for the barest means of subsistence is terrific. Illiteracy is high, linguistic and cultural groups numerous, and administrative problems almost insuperable. The dread word *hambre*—hunger—is never far from the lips of most Mexicans. Mr. Gill has chosen his title well.

The resource problem of Mexico, as Mr. Gill points out, is not simple. The shortage of arable land and lack of water are obvious. The revolution, aiming at more equitable distribution of the land, actually lowered the production of food by destroying such managerial structure as there was. Meanwhile population has been increasing at the rate of some 5 percent every two years, erosion goes on continuously, forests and range land have been devastated. (As early as 1606 Enrico Martinez referred to some of the upland as having been *descarnado*—stripped to the bone—by deforestation and overgrazing which followed the Conquest.)

If the problem is not simple, neither is the solution. Technically, restoration of upland forests affords a logical point of attack, since it would reduce siltation of reservoirs and conserve moisture, besides furnishing cruelly needed materials. But restoration of the range and a generally coordinated program of wise land use and management are equally necessary. For in Mexico as elsewhere, all resources are inseparably involved with each other. None can be dealt with in isolation.

Actually Mexico has excellent resource laws, especially as regards forestry, but they are not, perhaps cannot be, enforced. The fundamental problem is one of human behaviour and values. Here Mr. Gill is wise and wary. His suggestion of demonstration areas, preferable embracing entire watersheds, seems sound. Certainly it was by demonstration fields, scattered over Mexico, that hybrid maize strains which had been developed by the Rockefeller Mission were introduced into Mexican agriculture. If anything can work to improve standards of land use, this method should.

"Soils, forests, water, agriculture practices, population trends, human attitudes, governmental integrity—all these go to make up the complex whole that has to do with Mexico's natural resource problem."

This is a tremendous challenge, and, as we are told, the hour is late. The friends of Mexico in this country, whose number grows yearly, could, I suspect, do nothing better than to assist, with tact and generosity, in setting up even a few demonstration areas as examples and encouragement to a splendid people. And as a starter, they could, and should, read this book.

PAUL B. SEARS,
Yale University.

Current Literature

Compiled by MARTHA MEELIG, *Librarian, The New York State College of Forestry*

Range Management Section Compiled by FRANCES FLICK, *Library, U. S. Department of Agriculture*

General

Coed y Brenin. 16 pp. Illus. Great Britain Forestry Commission, London. Britain's Forests 1950. 6d (H.M. Sta. Off.)

Indian Forest and Range; A History of the Administration and Conservation of the Redman's Heritage. By J. P. Kinney. 357 pp. Foresty Enterprises, 1740 K St., N. W., Washington 6, D. C. 1950. $4.50.

Nature's Ways; How Nature Takes Care of its Own. By R. C. Andrews. 208 pp. Illus. Dover Pub. Co., 1780 Broadway, New York 19. 1951. $3.75.

Our Forests: What They Are and What They Mean To Us. By C. E. Randall and M. F. Heisley. 38 pp. Illus. U. S. Dept. of Agric., Washington 25, D. C. Misc. Pub. No. 162, rev. 1951. 15 cents (Govt. Print. Off.)

Tintern. 16 pp. Illus. Great Britain Forestry Commission, London. Britain's Forests. 1950. 9d (H. M. Sta. Off.)

Forest Economics

Besitz und Verpflichtung; Ein Beitrag der Waldwirtsshaft zur socialökonomischen Problematik unserer Zeit. By Franz Heske. 165 pp. Mitteilungen der Bundesanstalt für Forst-und Holzwirtschaft, Universität Hamburg. Nr. 19. 1950.

An Economic Survey of Forestry in Kenya and Recommendations Regarding a Forest Commission. 60 pp. The English Press, Ltd., Kenya. 1950 2s.

Importance and Causes of Timber Mortality in Eastern Montana Forests. By M. E. Metcalf. 4 pp. Northern Rocky Mt. Forest and Range Expt. Sta., Missoula. Research Note No. 93. 1951. Mimeog.

Relation Between the Consumption of Round Timber and the Production of Ore in the Metal Mines of the Northern Rockies. By B. M. Huey. 3 pp. Northern Rocky Mt. Forest Expt. Sta., Missoula. Research Note No. 94. 1951. Mimeog.

Taxation of Crown-Granted Timberlands in British Columbia. By Lowell Besley. 86 pp. Univ. of British Columbia, Vancouver. Forestry Bul. No. 1 1951.

Forest Management

Forest Management. By H. H. Chapman. XIX, 582 pp. Hildreth Press, Bristol, Conn. 1950. $6.

Form Class Volume Tables for Use in Southern Pine Pulpwood Timber Estimating. By C. O. Minor. 39 pp. Louisiana State Univ. Agric. Expt. Sta., Baton Rouge. Louisiana Bul. No. 445. 1950.

Management of Bottomland Hardwoods. By J. A. Putnam. 60 pp. Southern Forest Expt. Sta., New Orleans. Occasional Paper No. 116. 1951.

Forest Resources

Area and Ownership of Forest Land in Siskiyou County, California. By G. F. Burks and Adon Poli. 23 pp. Calif. Forest and Range Expt. Sta., Berkeley. Forest Survey Release No. 8 1950. Mimeog.

Logging and Milling

The Berger-Rees Air-Tong Loader. By T. E. Collins. 7 pp. Illus. Inst. of Forest Products, Univ. of Washington. Dept. of Conservation and Development, Seattle. Cir. No. 11. 1951.

Northeastern Logger's Handbook. By F. C. Simmons. 164 pp. U. S. Dept. of Agric., Washington 25, D. C. Agriculture Handbook No. 6. 1951. 75 cents (Govt. Print. Off.)

Pathology

Chestnut Blight Caused by the Fungus Endothia Parasitica. 8 pp. Illus. Great Britain Forestry Commission, London. Booklet No. 3. 1950. 2s 6d (H. M. Sta. Off.)

Clitocybe Root Rot of Woody Plants in the Southeast United States. U. S. Dept. of Agric., Washington 25, D. C. Cir. No. 853. 1951.

Protection

Control of the Pine Needle Scale in the Prairie Provinces. 4 pp. Canada Dept. of Agric. Div. of Entomology, Ottawa. Processed Pub. Ser. No. 121. 1950.

Range Management

The Global Distribution of the Tribes of the Gramineae in Relation to Historical and Environmental Factors. By W. Hartley. Australian Jour. of Agric. Research, Melbourne. Vol. 1, pp. 355-373. Maps. October 1950.

Handbook of North Dakota Plants. By O. A. Stevens. 324 pp. North Dakota Agric. College, Fargo. 1950. $5.

Picture Aids to Grass Identification, Vol. I. By H. B. Hartwig. 24 pp. Illus. M. S. Hartwig, 109 Worth St., Ithaca, N. Y. 1950. $1.

Poisonous and Injurious Plants in Colorado. By L. W. Durrell and others. 80 pp. Illus. Colorado A. & M. College, Extension Serv., Fort Collins. Bul. No. 412-A. May 1950. (Colo. Agric. Expt. Sta. Bul. No. 455, revised.)

Practical Grassland Management. By B. W. Allred. 323 pp. Sheep & Goat Raiser, San Angelo, Tex. 1950. $5.

Russian Wildrye. By Frank Knittle. 3 pp. Wyoming Range Mgt., Laramie. No. 33. March 1951. Mimeog.

Waldgräser. By H. Hesmer and J. Meyer. Ed. 2, 122 pp. Illus. M. & H. Schaper, Hannover, Germany. 1950. $4.

Silviculture

Growing Christmas Holly. By H. W. Dengler. 10 pp. Univ. of Maryland Ext. Serv., College Park. 1951.

Scrub Oak in Pennsylvania. 20 pp. Illus. Pennsylvania Dept. of Forests and Waters, Harrisburg. 1951.

Soils

Soil Permeability Determinations for Use in Soil and Water Conservation. By R. E. Uhland. 36 pp. Illus. U. S. Soil Conservation Serv., Washington 25, D. C. 1951. TP-101.

Wood Preservation

The Protection of Buildings and Timber Against Termites. By W. D. MacGregor. 41 pp. Illus. Great Britain Dept. of Scientific and Indus. Research, Forest Products Research, London. Bul. No. 24. 1950. 1s 9d (H. M. Sta. Off.)

Wood Technology and Utilization

Building Timbers in New Zealand. By J. S. Reid. 28 pp. New Zealand Forest Serv., Wellington. Forest Products Research Notes v. 1, no. 1. 1950.

Farm Woodlot Aspen for Creped Tissue Paper. By J. N. McGovern and G. E. Mackin. 8 pp. Tables. U. S. Forest Products Laboratory, Madison, Wis. R1783. 1950. Mimeog.

Seasoning of White Oak for Tight Cooperage. By E. F. Rasmussen and J. M. McMillen. 15 pp. Illus. U. S. Forest Products Laboratory, Madison, Wis. R1784. 1950. Mimeog.

The Seasoning Properties of Exotic Timbers—Part 1 and Supplement No. 1. Great Britain Dept. of Scientific and Indus. Research, London. Leaflet No. 44 1949-50.

Study of the Tannin Contents of Barks from the Florida Scrub Oaks Quercus laevis and Q. cinerea. By J. S. Rogers, H. N. Calderwood and C. W. Beebe. 28 pp. Illus. Florida Engin. and Indus. Expt. Sta., Gainesville. 1951. Tech. Paper Ser. No. 56. Reprint from Florida Engin. Soc. Jour. June 1950.

Use Maryland Trees for Your Farm Buildings. By H. W. Dengler. 2 pp. Illus. Univ. of Maryland Ext. Serv., College Park. Fact Sheet No. 9. March 1951.

Wood Waste in Ohio. By J. W. Meteer. 29 pp. Illus. Ohio Agric. Expt. Sta., Wooster. Research Bul. No. 698. 1951.

Society Affairs

Compiled by ROBERT D. HOSTETTER, *Assistant Executive Secretary*

Officers and Members of the Council, 1950-1951

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2867 Piedmont Road
Atlanta, Ga.

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St. Paul 1, Minn.

RICHARD E. MCARDLE
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C. OTTO LINDH
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Albuquerque, N. M.

DEWITT NELSON
Division of Forestry
Department of Natural Resources
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GORDON D. MARCKWORTH
College of Forestry
University of Washington
Seattle 4, Wash.

STANLEY G. FONTANNA
State Department of Conservation
Lansing 12, Mich.

EARL PORTER
Southern Kraft Division
International Paper Company
Mobile 9, Ala.

Southern Forestry and Hospitality To Be Features of Biloxi Meeting

"Southern Forests—Past, Present, and Future" is the theme selected by General Chairman Charles A. Connaughton for the general sessions of the Society's fifty-first annual meeting. It is to be held on December 12-15, 1951 in Biloxi, Miss. Headquarters will be at the Buena Vista Hotel.

Dr. Connaughton was appointed by President Charles F. Evans as general chairman of the meeting and as chairman of the committee which is planning the general sessions and the banquet program. Dr. Connaughton is regional forester of the Southern Region, U. S. Forest Service, Atlanta, Ga. Formerly, he was director of the Southern and the Rocky Mountain Forest and Range Experiment Stations. Other members of the program committee are Robert T. Clapp, W. C. Hammerle, H. C. Mitchell, and J. M. Stauffer.

T. E. Maki will supervise the work of committees which make local arrangements for the meeting. Special evidence of the friendliness and generosity of the Gulf States Section will be a "hospitality hall" where members in attendance can partake of luscious-tasting denizens of the Gulf of Mexico while renewing old acquaintances with former associates.

Papers to be presented at the first general session on Thursday morning, December 13 include:

1. Southern Forests — Then and Now, I. F. Eldredge.

2. Building an Industry on Cut-Over Lands, Paul Garrison.

C. A. CONNAUGHTON

3. Integrating Production and Utilization, Peter Watzek.

4. Importance of Hardwood Utilization Trends in Southern Forestry, C. D. Dosker.

The Society Affairs session will be Thursday afternoon with alumni group meetings and similar gatherings that evening.

Division meetings will be held on Friday with an entertaining banquet program that evening.

The final general session will be on Saturday morning, December 15.

Topics already scheduled are:

1. The South's Approach to Regional Education in Forestry, Wm. J. McGlothlin.

2. The Forest Future of the South, W. A. Duerr.

Eight Fellow Grade Candidates Named

Eight Members of the Society had been nominated by April 30, 1951 as candidates for election to the Fellow grade. Fellows will be elected on December 1, 1951 by an electoral board composed of the Council and current Fellows.

Petitions nominating the following candidates have been submitted: Hugh Curran, Emanuel Fritz, DeWitt Nelson, Harold S. Newins, George M. Hunt, E. L. Demmon, Jay H. Price, and Woodbridge Metcalf.

October 8, 1951 is the deadline for submitting nominating petitions which must be signed by 25 Members or Fellows. See previous issues of the JOURNAL for further details.

Dues Deadline is June 30

Members whose dues are not paid by June 30 will be in bad standing. They will be ineligible to vote, receive the Society's publications, or be a candidate for office until their dues are paid. When good reasons are advanced, the Council may upon request extend the period during which current dues may be paid.

Council Candidates Nominated by Petition

Petitions nominating Earl Porter, Gordon D. Marckworth, and Robert K. Winters for posts as Council members were submitted to the Nominating Committee prior to April 30, copy deadline for this issue of the JOURNAL.

The election of nine Council members to serve during 1952 and 1953 will conclude with the counting of ballots on December 1, 1951. All nominating petitions must be filed in the Society office by October 8, 1951.

The form of petition to use in nominating Council members is as follows:

We, the ten or more undersigned voting members of the Society of American Foresters, hereby nominate ———— to serve as a member of the Council for the two-year term of 1952 and 1953.

Rules governing the nomination of officer and Council member candidates are:

1. All candidates must be Members or Fellows in good standing and state in writing their willingness to serve if elected.

2. Each petition must be for one candidate only and must be signed by at least ten voting members (Junior, Member, Fellow) who are in good standing. A voting member may sign only one petition to nominate a presidential candidate and one petition to nominate a Council member.

3. Petitions must be filed in the office of the Society of American Foresters, Mills Building, Washington 6, D. C. by October 8, 1951.

NOTE: The nomination of P. A. Thompson for Council member was filed on May 14, 1951. His photo will appear in the July JOURNAL.

Wisconsin-Upper Michigan Section Holds Meeting

The Wisconsin - Upper Michigan Section of the Society of American Foresters held its annual winter meeting in Escanaba, Mich. on March 29 and 30, 1951.

The program on March 29 consisted of a report by Bruce Buell, Northern Paper Mills, Green Bay, on the activities of the Cooperative Management Research Committee. This was followed by a discussion on the spruce budworm by Dr. M. L. Prebble of the Forest Insects Laboratory, Sault Ste. Marie, Ontario.

On the following day Dr. Hereford Garland, Leland W. Hooker, and A. W. Toole of the Michigan College of Mining and Technology gave reports on the progress of forest products research at that institution.

A banquet was held on the evening of March 29 after which Edward Steigerwaldt of the Wisconsin Conservation Department showed slides and narrated his experiences in forestry in Japan.

At the business session new officers were elected as follows: Chairman—Maurice Day, superintendent, Dunbar Forest Experiment Station, Sault Ste. Marie, Mich. and Secretary-Treasurer—R. C. Hammerschmidt, Wood Procurement, Cliff Dow Chemical Company, Marquette, Mich.

Members Assist Recent Graduates

Over a thousand recent forestry graduates will soon appear on the professional scene in the United States. Anxious to apply their newly acquired knowledge but equally anxious to avoid making mistakes, they will appreciate the friendly guidance of more-experienced foresters.

Society members can perform a great service to young foresters in helping them get the feel of the profession. Part of their professional experience will be their participation in Section and Chapter meetings. Invite them to attend!

Nearly half of the eligible 1951 forestry graduates were Student Members and are being advanced to the Junior Member grade. Let them have no doubt that they really belong. Assist the others to apply for membership. S.A.F. brochures and membership forms are available from each Section's membership chairman and from the Society office.—*RDH*

EARL PORTER

GORDON D. MARCKWORTH

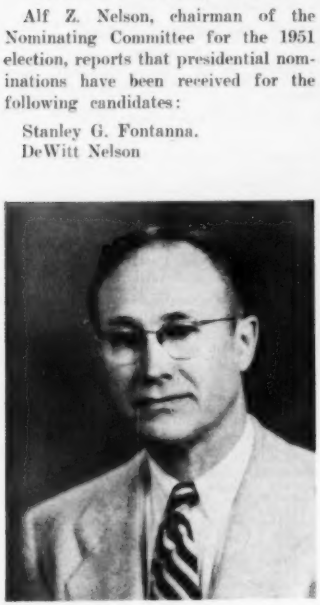
ROBERT K. WINTERS

Petitions nominating Earl Porter, Gordon D. Marckworth, and Robert K. Winters for consideration as Council members have been filed in the Society office. Mr. Porter is a member of the present Council and a former chairman of the Division of Private Forestry. He is manager of the Woodlands Department, Southern Kraft Division, International Paper Company, Mobile, Ala. Mr. Marckworth is dean of the College of Forestry at the University of Washington, Seattle. He is a current member of the Society Council. Mr. Winters, as chairman of the Society's Committee on the History of Forestry, edited "Fifty Years of Forestry in the U.S.A." which was published last year. He is forest economist at the Central States Forest Experiment Station, Columbus, Ohio.

Presidential Nominations Filed in Society Office

Alf Z. Nelson, chairman of the Nominating Committee for the 1951 election, reports that presidential nominations have been received for the following candidates:

Stanley G. Fontanna.
DeWitt Nelson



STANLEY G. FONTANNA

Mr. Fontana is deputy director of the Michigan Department of Conservation, Lansing, Mich. He is a past president of the Association of State Foresters. Currently a member of the Council, he is serving as chairman of the Council Committee on Divisions which is seeking to devise means whereby the Society's subject matter Divisions can function with a minimum of conflict and a maximum of accomplishment.

Mr. Nelson is the state forester of California. He directs the Division of Forestry in the Department of Natural Resources, Sacramento, Calif. He is now serving his second two-year term as a member of the Society's Council.

Petitions nominating presidential candidates may be initiated by any voting member but must bear the endorsement of at least 10 voting members. They must be filed in the Society office by October 8, 1951. The following form of petition is suitable:

We, the ten or more undersigned voting members of the Society of American Foresters, hereby nominate _____ for the office of president for the two year term of 1952 and 1953.

DEWITT NELSON

The presidential candidate receiving the highest vote is elected president, while the candidate receiving the next highest vote is elected vice president. The election will close on December 1, 1951.

Rules governing the nomination of presidential candidates are the same as for Council member candidates.

Chapter Notes

The Florida Chapter of the Southeastern Section held a meeting at Ocala, Fla. on May 4 and 5 that featured sand pine management. The Georgia Chapter is planning to meet on August 10 and 11 at Gainesville, Ga. for a meeting and field trip that will emphasize watershed management. The Alabama Chapter will meet at Auburn, Ala. in September.

Licensing of foresters to protect the public against incompetent service in timberland management was given top consideration at the spring Manistee meeting of the Lower Michigan Chapter of the Central States Section.

Current officers of the Black Hills Chapter of the Central Rocky Mountain Section are M. K. Meines, Les Albee, and G. C. Moon.

The Northeastern Wisconsin Chapter of the Wisconsin-Upper Michigan Section heard Ralph Hovind discuss "wildlife management problems in northeastern Wisconsin" at its meeting on April 6 near Rhinelander.

Marlowe Burgy is the newly elected chairman of the Chapter and Edward Steigerwaldt serves as secretary-treasurer.

Georgia Scores Again

All 22 of the foresters graduating in June from the University of Georgia School of Forestry were Student Members of the Society of American Foresters and are being advanced to the Junior Member grade. One hundred percent of the Georgia foresters consistently apply for Society membership.

Archie E. Patterson is the official Section representative of the Southeastern Section at the University of Georgia.

Frantz Appointed

Chairman M. K. Goddard of the Allegheny Section has appointed Harvey R. Frantz as Secretary-Treasurer to succeed J. Howard Mendenhall. Mr. Mendenhall has accepted a position with the Society for the Preservation of New Hampshire Forests.

Mr. Frantz is forester for the Interstate Commission on the Delaware River Basin, Dodson Building, 528 N. New Street, Bethlehem, Pa.

A. P. I. Grads Apply

One hundred percent of the winter quarter graduates at Alabama Polytechnic Institute applied for Junior Membership in the Society of American Foresters.

Coming Events

Upper Mississippi Valley Section

The annual summer meeting of the Upper Mississippi Valley Section will be held on June 15 and 16 in the Whitewater Valley, near St. Charles, in southeastern Minnesota. The meeting will include a banquet on June 15 and a field trip on June 16 covering plans and accomplishments in erosion control, ground cover re-establishment, and wildlife restoration.

526 in Student Grade

Student Membership in the Society of American Foresters totaled 526 on May 1, 1951.

There were 61 Student Members at the University of California, 58 at Oregon State College, 48 at the University of Georgia, and over 20 at each of seven other accredited forestry schools.

George Duthie, chairman of the Washington Section's Stamp Committee requests Society members and others interested in the wise use of renewable resources to urge approval of this proposed postage stamp by the Postmaster General.

Stamp Committee Changes Tactics

Inasmuch as a commemorative stamp honoring Gifford Pinchot, the Society's first president, failed of approval by the Postmaster General during the S.A.F. Golden Anniversary year, the Washington Section's stamp committee has altered its tactics. This announcement was made by George Duthie, chairman of the committee. Other members of the committee are Ovid Butler, Henry Clepper, Newton B. Drury, and Richard E. McArdle.

The stamp committee now plans to secure the cooperation of conservation agencies in a campaign for a stamp which will focus public attention on the need for the conservation of the basic natural resources—soil, water, forests, and wildlife.

The tentative stamp design illustrated was suggested by the committee and drawn by Rudolph A. Wendelin. Upon viewing the design, the Postmaster General and his staff praised it highly. Hope for prompt approval was blasted, however, when it was learned that for economy reasons commemorative issues will be confined to four stamps which already are being processed.

George Duthie said, "The Department did not rule out the possibility of approval of the conservation subject later on," and he suggests individuals and organizations urge the Postmaster General, Post Office Department, Washington 25, D. C. to schedule the issuance of a conservation stamp. The stamp has already been endorsed by the Izaac Walton League, the National Wildlife Federation, and other organizations, as well as by the Society.

Candidates for Membership

Candidates for membership whose applications were received in the Society office prior to May 1, 1951 are listed below. Names, positions, addresses, and education are given.

Action regarding the eligibility of these candidates will be taken by the Council as of July 1, 1951. Comments, protests, or important information regarding the qualifications for membership of candidates listed are invited from present voting members. All such communications are kept strictly confidential, being used only by the Council in taking final action on applications. Correspondence should be received in the Society office prior to July 1, 1951.

The names of those candidates who are elected will be published in the Society Affairs department of the August 1951 JOURNAL OF FORESTRY. The names of those who signify their acceptance of election will be published in subsequent issues of the JOURNAL.

Allegheny Section

Junior Grade

Kirk, C. R., Grad. Asst., Pa. State College, State College, Pa.; Pa. State, B.S.F., 1950.

Lucas, C. A., Farm Forester, W. Va. Cons. Comm., Lewisburg, W. Va.; W. Va. Univ. B.S.F., 1950.

Affiliate Grade

Ferguson, H. C., Reservation Forester, Boy Scouts of America, Washington, Pa.; Pa. State, (2 yrs.).

Appalachian Section

Member Grade

Milliken, W. F., Consulting Forester, Williston, S. C.; Mich. State, B.S.F., 1943. (Junior, 1947).

Straight, F. M., Dist. Forester, Va. Cons. Comm., Charlottesville, Va.; W. Va. Univ. B.S.F., 1947. (Junior, 1948).

Associate Grade

Copeland, O. L., Jr., Soil Scientist, Div. of Forest Path., U.S.D.A., Union, S. C.; Clemson Agric. College, B.S., 1939; Pa. State, M.S., 1941.

Central Rocky Mountain Section

Junior Grade

Cooper, C. F., Forester, Bur. of Land Management, U.S.D.A., Durango, Colo.; Univ. of Minn., B.S.F., 1950.

Gause, D. W., Hallack and Howard Lbr. Co., Denver, Colo.; Colo. A & M., B.S.F., 1949; M.F., 1950.

Member Grade

Stagelman, H. W., Dist. Rgr., U.S.F.S., Fort Collins, Colo.; Colo. A & M.; B.S.F., 1934. Reinstatement.

Central States Section

Junior Grade

Hamilton, G. J., 23073 Easterling, Hazel Park, Mich.; Univ. of Mich., B.S.F., 1951.

Strauss, R. H., Lbr. Buyer and Forester, J. P. Dodge and Son, Ashtabula, Ohio; Mich. State, B.S.F., 1949.

Member Grade

Grabow, R. H., Forest Supv., U.S.F.S., Bedford, Ind.; Univ. of Minn., B.S.F., 1920. Reinstatement.

Columbia River Section

Junior Grade

Greathouse, T. E., Forestry Aide, U.S.F.S., Oakridge, Oreg.; Univ. of Mich., B.S.F., 1950.

Stryker, R. K., Thr. Buyer, Oregon Pulp and Paper Co., Portland, Oreg.; Univ. of Wash., B.S.F., 1937.

Ten Eyck, R. A., Levelman, Weyerhaeuser Tbr. Co., Longview, Wash.; Oregon State, B.S.F., 1950.

Affiliate Grade

Brown, B. E., Forester, U.S.F.S., Zigzag, Oreg.; Washington State College, B.S., (Forestry), 1940.

Gulf States Section

Junior Grade

Clark, H. D., Jr., Chief Forester, Fisher Lbr. Corp., Wisner, La.; Henderson State Teachers College, B.A., 1943; La. State, M.F., 1948.

Int-Hout, P. B., Forester, U.S.F.S., Raleigh, Miss.; Univ. of Idaho, B.S.F., 1949.

Kite, J. A., Jr., 1517 Third St., Gulfport, Miss.; A.P.I., B.S.F., 1951.

Palmer, W. M., Assoc. Prof. of Forestry, La. State Univ., Baton Rouge, La.; La. State, B.S.F., 1937; Univ. of Mich., M.F., 1938. Reinstatement.

Member Grade

Moore, J. S., Asst. Forester, L. N. Dantzler Lbr. Co., Perkinston, Miss.; La. State, B.S.F., 1939. (Junior, 1939R49).

Myers, J. W., Jr., Forestry Agent, Illinois Central R.R., Baton Rouge, La.; La. State, B.S.F., 1941. (Junior, 1947).

Vincent, P. Y., Asst. Forest Supv., Texas Nat'l. Forest, Lufkin, Texas; Mich. State, B.S.F., 1932. Reinstatement.

Affiliate Grade

Allen, B., Parish Forester, La. Forestry Comm., Woodworth, La.; L. P. I., B.S., (Forestry), 1950.

Bankston, F. T., Asst. Dist. Forester, Int. Paper Co., Amite, La.

Boatman, J. H., Jr., Forester, Newport Industries, De Quincy, La.; L. P. I., B.S., (Forestry), 1949.

McDonald, F. O., Asst. Dist. Forester, Nebo Oil Co., Inc., Good Pine, La.; L. P. I., B.S., (Forestry), 1950.

Morgan, C. H., Dist. Forester, Miss. Forestry Comm., Wiggins, Miss.; Univ. of the South, B.S., (Forestry), 1949.

Parsons, M. B., Dist. Rgr., Miss. Forestry Comm., Wiggins, Miss.

Intermountain Section

Junior Grade

Newell, F. P., Grad. Student, Utah State Agric. College, Logan, Utah; Utah State, B.S.F., 1950.

New England Section

Junior Grade

Arsenault, R. W., Tallyman, South Portland Planning Mill, Inc., South Portland, Me.; Univ. of Me., B.S.F., 1950.

Chase, E. E., Jr., Foreman Salesman, F. A. Bartlett Tree Co., Cambridge, Mass.; Univ. of Me., B.S.F., 1950.

Gildersleeve, R. T., Asst. Lbr. Buyer, F. W. Mears Heel Co., Lawrence, Mass.; Univ. of Mass., B.S.F., 1950.

Goldberg, A. G., Grad. Student, Univ. of Me., Orono, Me.; Univ. of Me., B.S.F., 1950.

Hodsdon K. Y., Cruiser, Penobscot Development Co., Great Works, Me.; Univ. of Me., B.S.F., 1950.

Sleight, C. K., Grad. Student, Yale Univ., New Haven, Conn.; Univ. of Me., B.S.F., 1950.

Affiliate Grade

Lane, P. T., Asst. Farm Mgr., and Forester, Henry P. Kendall, Sharon, Mass.

Associate Grade

Marsh, J. W., Sr., Entomologist, Me. Forest Service, Augusta, Me.; Univ. of Me., B.S., (Ento.), 1935.
Storer, T. L., Pres., R. M. Bradley and Co., Inc., 84 State St., Boston, Mass.; Harvard Univ., A.B., 1918.

New York Section

Junior Grade

Vredenbrugh, M., Field Repre., and Forester, Otsego Forest Products Assn., Inc., Cooperstown, N. Y. (Affiliate, 1948).

Associate Grade

Meelig, M. L., Librarian, College of Forestry, Syracuse, N. Y.; Syracuse Univ., B.S.L.S., 1927.

Northern California Section

Junior Grade

Dittman, J. R., Forester, U.S.F.S., North Fork, Calif.; Oregon State, B.S.F., 1950.

Member Grade

Greene, G. E., Forester, U.S.F.S., Berkeley, Calif.; Colo. A & M., B.S.F., 1941. (Junior, 1947).

Northern Rocky Mountain Section

Junior Grade

Metcalf, M. E., Forester, Northern Rocky Mt. Forest and Range Exp. Sta., Missoula, Mont.; Mont. State, B.S.F., 1950.
Meyer, M. P., Surveying and Cartographic Engr., U.S.F.S., Missoula, Mont.; Univ. of Minn., B.S.F., 1949; Univ. of Calif., M.F., 1950.
Miller, G. A., Partner, Kalispell Lbr. Co., Kalispell, Mont.; Univ. of Wash., B.S.F., 1923.

Member Grade

Ela, T. F., Park Rgr., Nat'l. Park Service, Yellowstone Park, Wyo.; Colo. A & M., B.S.F., 1940. (Junior, 1947).
Nelson, D. S., Park Rgr., Nat'l. Park Service, Yellowstone Park, Wyo.; Univ. of Mont., B.S.F., 1940. (Junior, 1947).

Ozark Section

Junior Grade

Haygood, J. L., Tech., Int. Paper Co., Arkadelphia, Ark.; La. State, B.S.F., 1951.
Todd, W. J., 720 Key West Ave., Webster Grove, Mo.; Missouri Univ., B.S.F., 1950.

Affiliate Grade

Peebles, E. G., Forester, Dierks Lbr. and Coal Co., Broken Bow, Okla.; Okla. A & M., B.S., (Forestry), 1950.

Puget Sound Section

Junior Grade

Grette, O. C., Land Examiner, Weyerhaeuser Tbr. Co., Raymond, Wash.; Univ. of Minn., B.S.F., 1949.
Hack, N. H., Compassman, Draftsman, Rayonier Inc., Sappho, Wash.; Colo. A & M., B.S.F., 1950.

Affiliate Grade

Corbin, J. L., Tbr. Cruiser, Dept. of Public Lands, Chehalis, Wash.
Morton, L. V., Asst. Dist. Forest Warden, Div. of Forestry, North Bend, Wash.; State College of Washington, B.S., (Forestry), 1949.

Southeastern Section

Junior Grade

Baggette, D. E., Forester, Int. Paper Co., Mobile, Ala.; A. P. I., B.S.F., 1950.
Levi, A. C., Forester, Int. Paper Co., Mobile, Ala.; A. P. I., B.S.F., 1950.

Member Grade

Turner, J. E., Farm Forester, Fla. Forest Service, Ocala, Fla.; Univ. of Fla., B.S.F., 1940. Reinstatement.

Upper Mississippi Valley Section

Junior Grade

Helm, J. R., Tbr. Cruiser, North Star Tbr. Co., Duluth, Minn.; Univ. of Minn., B.S.F., 1950.
Imfeld, D. A., Student, Iowa State College, Ames, Iowa; Iowa State, B.S.F., 1951.
Sapousek, O. F. A., Forester, Consolidated Water Power and Paper Co., Little Marais, Minn.; Iowa State, B.S.F., 1950.

Washington Section

Member Grade

McKellar, A. D., Forest Products Div., National Production Authority, Washington, D. C.; La. State, B.S.F., 1930. Reinstatement.

Wisconsin-Upper Michigan Section

Member Grade

Korotev, J. R., Dist. Forester, Wis. Cons. Dept., Green Bay, Wis.; Univ. of Mich., B.S.F., 1942. (Junior, 1947).

Affiliate Grade

Knapp, C. A., Forester, Wis. Cons. Dept., Tomahawk, Wis.; Mich. College Mining and Tech., B.S., (Forestry), 1949.

Candidates Elected

The following persons were elected to the indicated grades of membership by the Council on May 1, 1951.

Junior Grade

Allan, K. M., (re)
Berkley, R. L.
Brendemuehl, R. H.
Bruns, R. R.
Buell, D. L.
Burton, J. D.
Carlson, C. E.
Carlson, F. J., Jr.
Cobb, D. I.
Coyer, E. L.
Crail, C. J.
Crankshaw, W. B.
Curtin, T. W.
Deed, R. N.
Dobbins, F. D.
Dowd, L. W.
Dressel, A. T.
Driver, W. R.
Edscorn, K. C.
Eloff, J.
Evenson, C. M.
Faria, T. I.
Feuchter, R. W.
Feilding, J. E.
Foley, T. A.
Fyffe, W. E.
Glaser, E. H.
Goldsmith, W. H.
Green, E. J., Jr.
Groncki, A. R.
Gustafson, R. W.
Hall, F. C.
Hall, W. S., Jr.
Hamann, R. E.
Hamilton, J. W.
Harper, R. M., (re)
Harris, C. E.
Harris, C. G.
Hassler, M. G.
Hebble, K. A.
Hess, J. C.
Heyden, R. E. C.
Hill, R. M.
Hoffman, W. H.
Hoover, D. B.
Huffman, C. E.
Jirsa, D. E.
Johnson, W. R.
Johnson, W. P.
Kiefer, J.
Larson, W. O.
Lashley, O. L.
Leaphart, C. D.
Leland, F. C.
Lodge, G. W., Jr.
Lofgren, J. O.
Maben, R. L.
Mathews, W. G., Jr.
Matt, L. E.
Mayrand, E. J.
McCoy, E. W.
Moeller, C. A., Jr.
Moran, H. B.
Morin, J. J.
Nichols, E. E.
Nye, J. W.
Palmer, H. S.
Rehling, H. W.
Reynolds, R. D.
Rhyne, T. S., Jr.
Richards, B. C.
Satterlund, D. R.
Scherf, J. J.
Schildknecht, J. R.
Schoby, B. F.
Schweitzer, F. J., Jr.
Seybold, W. H.
Smith, R. A.
Sorber, R. P.
Stevenin, H. L.
Stevens, G. J.
Storkman, A. A.
Stulpin, E. J.
Swenningson, R. T.
Sykes, C. K.
Thomasson, G. S.
Valentine, R. R.
Warner, L. H.
Watkins, W. P.
Welch, H. D., Jr.
Williams, G. J.
Wood, E. B.
Young, E. J.

Member Grade

Burwell, J. C.
Bryan, S. H.
Emmert, F. C.
Gallup, J. A.
Grambo, E. J.
Grogan, G. R.
Gurley, W. E.
Hammack, B. L.
Horn, M. J.
James, W. C.
Keast, F. W.
Kennedy, R. B.
Kincaid, F. H.
Kirkpatrick, H. W.
Klemme, M., (re)
Marbut, S. A.
Markell, M. L., Jr.
Mayer, C. E.
McConkey, T. W.
Norris, F. W.
Oft, H. H.
Packer, P. E.
Parmelee, S. R.
Phillip, M. F.
Rider, R. R.
Rogers, F. J.
Schmidt, A. H.
Sechrist, E. E., Jr.
Tackle, D.
Watts, G. L.
Weight, F. F.
White N. M.
Williams, G. W.
Wilson, K. O.
Winkler, O. E.

Affiliate Grade

Allhiser, A. F.
Columbro, C.
Dantzler, T. H.
Duvendack, G. H.
Hammond, J. G.
Jackson, G. H.
Jorgensen, C. G.
Plumb, A. W.
Sargent, L. B.
Tryon, T. C.

Associate Grade

Austin, R. C.
Gray, C. T.
Mook, P. V.

New Members and Advancements

The new members and members advanced in grade who are listed below are eligible for participation in activities of the Society of American Foresters, including the meetings and projects of Sections, Chapters, Divisions, and Committees. They have submitted their applications for membership, properly endorsed, and have been declared eligible by the Council. By accepting election, these members have indicated their desire to assist the Society in the fulfillment of its objectives.

Allegheny Section

Student Grade

PENNSYLVANIA STATE COLLEGE

Bosselman, H. H.
Haney, G. P.
McDonald, W. R.
Moore, H. J.
Perash, J. H.
Tissue, O. C.
Walton, S. A.

WEST VIRGINIA UNIVERSITY

Shriver, T. J.
Miller, W. L.

Junior Grade

Miller, R. M. 907 W. 4th St., Williamsport, Pa.

Member Grade

Blatt, J. A., 384 S. Highland Ave., Pittsburgh, Pa.
Dugan, R. F., West Virginia Univ., Morgantown, W. Va.
Hall, C. R., Cons. Comm. of W. Va., Buckhannon, W. Va.
Harr, H. M., 616 Ruffner Ave., Charleston, W. Va.

Appalachian Section

Junior Grade

Brank, G. P., 515 N. Boundary St., Raleigh, N. C.
Evans, J. T., Sylva, N. C.
Force, N. F., Southern Forest Exp. Sta., Asheville, N. C.
Fournier, J. P., Jarratt, Va.
George, H. H., 419 Gaston Ave., Belmont, N. C.
Harmon, J. B., III, Waterboro, S. C.
Nicholson, J. C., 1209 Highland Ave., Camden S. C.

Member Grade

Boice, L. M., Box 673, Orangeburg, S. C.
Douglass, R. S., Box 111, Clinton, N. C.
Goodwin, O. C., Jr., N. C. Forest Service, Lexington, N. C.
Oliver, H. R., Box 52, Newberry, S. C.
Robinson, J. T., Summerville, S. C.

Affiliate Grade

Schwartz, C. M., Box 4648, Durham, N. C.

Central Rocky Mountain Section

Student Grade

COLORADO A & M COLLEGE

Assmus, C. W.

Central States Section

Student Grade

MICHIGAN STATE COLLEGE

Baker, D. H.
Jewell, F. F.

UNIVERSITY OF MICHIGAN

Aldon, E.
Coleman, J. H.
Driesbach, P. K.
Feeney, C. R. T.
Glass, T. D.
Giuntoli, J. A.
Jeffrey, W. H.
Keller, R. C.
Mackie, P. S.
McArdle, R. C.
Mosher, H. L.
Olivo, G. D.
Olson, C. E., Jr.
Peterson, T. A.
Scher, T. G.
Stephen, G. C.
Urie, D. H.
Wimpenny, A., Jr.

PURDUE UNIVERSITY

Campbell, J. M., Jr.
Evenson, A. L.
Worley, P. J.

Junior Grade

Barclay, W. H., 310 S. Constantine, Three Rivers, Mich.
Gustafson, R. E., 212 Third St., Ann Arbor, Mich.

Member Grade

Carter, L. A., Michigan State College, E. Lansing, Mich.

Columbia River Section

Student Grade

OREGON STATE COLLEGE

Brewer, T. M.
Butler, W. E.
Christiansen, L. M.
Counts, V. J.
Cowley, I. C.
Dane, C. W.
Duncan, J. D.
Graham, D. A.
Haglund, H. L.
Hickerson, W. V. D.
Hohenhaus, R. A.
Houghton, G. V.
Hubbe, G.
Jensen, R. L.
Juhl, T. C., Jr.
Kowal, H. W.
Lynd, H. C.
MacKenzie, D. E.
McFarland, H. J.
Nautel, W. G.
Newkirk, B. R.
Payette, R. C.
Petrie, K.
Reedy, G. L.
Richardson, W. A.
Rossheim, J. D.
Smith, R. E.
Smith, W. A.
Stang, D. A.
Stoll, A. K.
Stroup, E. D.
Sullivan, R. C.
Twombly, A. D.
Vogel, L. O.
Wanek, J.
Wells, S. N., Jr.

Junior Grade

Francis, J. B., Ranger Sta., Mapleton, Oreg.
Harris, R. C., Imperial Apts., Dallas, Oreg.
Hubbard, F. W., Jr., 1111 Colorado St., Longview, Wash.

Member Grade

Hoelscher, L. B., Box 630, Allegany, Oreg.
O'Leary, J. E., Oregon State College, Corvallis, Oreg.
Sartz, R. S., 423 U. S. Court House, Portland, Oreg.
Simpson, L. L., 801 King St., Medford, Oreg.
Surdam, E. L., 1847 Orchard, Eugene, Oreg.
Venator, J. D., 1174 Jackson, Eugene, Oreg.

Gulf States Section

Student Grade

LOUISIANA STATE UNIVERSITY

Fox, G., Jr.
Holloman, E. A.
Parker, J. W., Jr.

Junior Grade

Bartley, W. G., Box 23, Bessmay, Texas
Jefferies, R. H., Richton, Miss.
Miller, C. H., Woodlands Heights, Natchez, Miss.
Phillips, H. L., Box 1345, Meridian, Miss.

Member Grade

Cockroft, R. S., 757 Avalon Rd., Jackson, Miss.
Griffin, W. F., Box 26, Springhill, La.
McKnight, J. S., c/o Delta Exp. Sta., Stoneville, Miss.
Therrell, J. S., Box 16, State College, Miss.

Inland Empire Section

Student Grade

UNIVERSITY OF IDAHO

Bonnett, H. W.
Carmichael, R. L.
Crabb, W. F.
Del Mar Jaquish, E.
Fellin, D. G.
Gilbertson, H. W., Jr.
Gorsuch, H. L.
Heiner, H. R.
Herman, K. E.
Holton, C. L.
Johnson, R. A.
Knoerr, K. R.
Land, H. C., Jr.
Lorts, J. G.
Marr, W. R.
Matzner, F. T.
McMahon, R. O.
Ohs, C. A.
Peairs, R. S.
Sachek, W. A.
Stahl, M. K.

Junior Grade

Haupt, H. F., 49 W. 31st Ave., Spokane, Wash.

Member Grade

Burnett, T. S., Cusick, Wash.
Ellis, E. L., Univ. of Idaho, Moscow, Idaho
Ritzheimer, E., Potlatch Forests, Inc., Boville, Idaho

Intermountain Section

Student Grade

UTAH STATE AGRICULTURAL COLLEGE

Birch, J. E., Jr.
Hart, W. J.
Hawkes, L. E.
Price, J. E.
Sader, D. A.

Member Grade

Krause, P. A., Box 46, Ft. Duchesne, Utah
McNaughton, F. H., U.S.F.S., McCall, Idaho

Kentucky-Tennessee Section

Member Grade

Morrill, W. M., U.S.D.A., S.C.S., Booneville, Ky.
Rhody, J. P., 300 S. Main St., Dawson Springs, Ky.

New England Section

Student Grade

UNIVERSITY OF MASSACHUSETTS

Bond, R. S.
Greer, A. M., Jr.
Gullion, B. S.
Peters, D. M.
Sutherland, K. I.

UNIVERSITY OF MAINE

Bigney, F. H.
Crockett, R. V.
Grove, E. R., Jr.
Kilbreth, H. E., Jr.
Sawyer, R. L.
Smith, D. B. H., Jr.
Taylor, L. S., Jr.
Tuttle, R. A.
Willis, A. C.

YALE UNIVERSITY

Baird, C. O.

Junior Grade

Forsyth, E. W., Addison, Me.
Miniutti, V. P., Box 114, North Berwick, Me.

Member Grade

Andersen, H. E., 241 Cosey Beach Ave., East Haven, Conn.
Call, F. M., James W. Sewall Co., Old Town, Me.
Maines, J. T., Great Northern Paper Co., Bangor, Me.
Merrill, J. H., Anglo Canadian Pulp and Paper Mill Ltd., Quebec, P. Q., Canada.
Place, I. C. M., Fredericton, N. B., Canada.
Strout, D. F., 19 Union St., Livermore Falls, Me.

New York Section

Student Grade

STATE UNIVERSITY OF NEW YORK

Vernam, W. C.

Junior Grade

Bayless, B. J., Box 751, Lake George, N. Y.
Chabbott, G. H., Jay, Essex County, N. Y.
Engel, E. J., 2446 Creston Ave., New York, N. Y.
Fitch, H. E., 217 N. Long St., Williamsville, N. Y.
Hagar, R. K., College of Forestry, Saranac Lake, N. Y.
Verbeck, A. R., 604 University Ave., Syracuse, N. Y.

Member Grade

Coutant, S. E., Staatsburg, N. Y.
Ruchmore, F. M., Bloomingdale, N. Y.
Stock, J. W., Conifer Lbr. Mills, Conifer, N. Y.
Stout, N. J., Lewis County Forest Survey, Lowville, N. Y.
Williams, R. B., College of Forestry, Syracuse, N. Y.
Zabel, R. A., College of Forestry, Syracuse, N. Y.

Affiliate Grade

Fraser, A. F., Spartan Air Services, Ottawa, Canada

Northern California Section

Student Grade

UNIVERSITY OF CALIFORNIA

Abarr, C. L.
Bright, D. W.
Crossfield, F. E.
Dake, C. G., Jr.
Dunham, M. A.
Evans, P. A.
Fisher, R. L.
Hughes, W. C.
Martin, E. F.
McLean, N., Jr.
Meeuwig, R. O.
Nelson, A.
Orr, T. J., III
Osburne, V. R.
Orr-Ewing, A. L.
Pland, R. H.
Price, L. S.
Price, V. R.
Quadro, F. E.
Ross, G. L. R.
Snow, G. H.
Springer, C. J.
Steinhouse, J. E.
Toland, J. R. S.
Wood, M. S.

Junior Grade

Babbitt, D. S., U.S.F.S., Adin, Calif.
Callahan, R. Z., Univ. of Calif., Berkeley, Calif.
England, C. D., c/o Masonite Corp., Ukiah, Calif.
Gehr, C. R., 2888 Nichols Canyon Rd., Hollywood, Calif.
Jacobson, W. R., 2235 Weldon Ave., Fresno, Calif.
Olson, N., Box 144, Mokelumne Hill, Calif.
Sweeley, J. F., c/o Masonite Corp., Ukiah, Calif.

Member Grade

Beaty, W. R., Box 1146, Westwood, Calif.
Clifton, T. C., U.S.F.S., Fall River Mills, Calif.
Rau, G. J., Box 1405, Mendocino, Calif.

Affiliate Grade

Clark, J. N., Box 36, Miramonte, Calif.
Higgins, R. B., 716 Madera St., Madera, Calif.
Jones, A. W., Jr., 2821 E. Barton Square, Fresno, Calif.

Northern Rocky Mountain Section

Student Grade

MONTANA STATE UNIVERSITY

Gibson, W. K.
Hanson, R.
Hawley, J. H.
Herrington, R. B.
Howard, H. R., Jr.
Hursh, M. H.
Rice, R. M.
Stockton, A. L.
Ziegler, R. C.

Junior Grade

Corrick, E. B., Box 603, Bonner, Mont.
Gill, J. M., Box 944, Libby, Mont.

Member Grade

Billings, S. T., West Fork Rgr. Sta., Darby, Mont.
Moore, K. E., 5 Chouteau St., Missoula, Mont.
Scott, D. R., 701 Public Bldg., Calgary, Alberta, Canada
Smart, R. A., Ranger Sta., Huson, Mont.

Ozark Section

Student Grade

UNIVERSITY OF MISSOURI

Kerr, R. S.
Kunz, R. H.
Ochrymowych, J.
Robinson, J. H., Jr.
Todd, W. G.
Vendeven, J. A.

Member Grade

Bruce, R. I., Box 88, Hamburg, Ark.
Fletcher, P. W., Univ. of Missouri, Columbia, Mo.
Jaeger, J., Jr., Box 123, Camdenton, Mo.
Ralston, J. G., 717 E. Fourth St., El Dorado, Ark.

Affiliate Grade

Kurz, J. Q., Box 132, Broken Bow, Okla.

Puget Sound Section

Student Grade

UNIVERSITY OF WASHINGTON

Benfell, L. H., Jr.
Carroll, F. O.
Erikson, D. F.
McCollum, W. W.
Schmidt, F. D.
Smith, V. W.
Thomas, P. D.

Junior Grade

Bennett, S. M., Ranger Sta., Chelan, Wash.
Hadacek, A. F., 2024 15th St., Chehalis, Wash.
Stevens, M. J., Indian Service, Amanda Park, Wash.

Member Grade

Chester, C. E., 616 Madison Ave., Toppenish, Wash.
Gessel, S. P., Univ. of Washington, Seattle, Wash.
McCullough, R. N., Box 167, Enumclaw, Wash.
Mottishaw, J. S., Box 20, Port Alberni, B. C., Canada
Newman, S. A., Box 156, Everett, Wash.
Ridgeway, J. W., Box 411, North Bend, Wash.
Robinson, J. C., Everett Pulp and Paper Co., Everett, Wash.
Shaw, E. W., "Green Pastures," Lacey, Wash.
Skarra, P. E., c/o Yakima Indian Agency, Toppenish, Wash.

Affiliate Grade

Porter, W. A., 448 Kipling St., Victoria, B. C., Canada

Southeastern Section

Student Grade

UNIVERSITY OF GEORGIA

Baxter, H. O.
Brown, W. L.
Broyles, H. H.
Budreski, F. A.
DuLaney, B. F.
Gay, J. E.
Hardy, J. H.
Harrison, J. S.
Jackson, N. R.
Johnston, C.
Langdale, J. J.
Langley, J. H.
Lyle, E. S., Jr.
Miller, M. L., Jr.
Proctor, J. C.
Sheppard, W.
Smith, F. A.
Stanley, F. B., Jr.
Walker, G. D.
Wall, J. H.
Woodall, E. A.

Junior Grade

Albright, T. B., State Forest Ranger School, Lake City, Fla.
Beall, J. W., Rt. No. 3, Scottsboro, Ala.
Brightwell, C. N., Toccoa, Ga.

Dunn, R. W., Macon Kraft Co., Macon, Ga.
Groom, D. G., Box 32, Bainbridge, Ga.
Jenkins, G. G., Box 100, Sardis, Ga.
Moore, E. W., Box 56, Dadeville, Ala.
Nelson, W. R., 420 Howell St., Thomaston, Ga.
Ogletree, W. T., Lt., U. S. Army, Fort Benning, Ga.
Randall, W. R., Box 345, Madison, Ga.
Riley, O. L. Mount Berry, Ga.
Roberts, S. P., Box 23, Tallapoosa, Ga.

Southern California Section

Junior Grade

Hass, G. E., 4156 Locust St., Riverside, Calif.

Affiliate Grade

Pyles, H. K., U.S.F.S., San Diego, Calif.

Southwestern Section

Junior Grade

Engstrom, G. E., Box 542, Taos, N. Mex.

Member Grade

Hill, L. O., Jemez Springs, N. Mex.
Smith, Z. G., 207 S. Tulane, Albuquerque, N. Mex.
Watkins, A. G., U.S.F.S., Safford, Ariz.
Wilton, E. W., Box 3, Tres Piedras, N. Mex.

Upper Mississippi Valley Section

Student Grade

IOWA STATE COLLEGE

Komanetsky, M. Merriam, R. A.
Lynn, A. D.

UNIVERSITY OF MINNESOTA

Hillman, J. K. Tucker, J. C.

Junior Grade

Erickson, P. E., Box 126, Jewell, Iowa
Hertel, H. G., Adel, Iowa
Rozeboom, W. B., 1414 Main St., Rock Valley, Iowa
Soderling, D. E., 308 Hill, Dubuque, Iowa

Member Grade

Halligan, J. V., Box 510, Mankato, Minn.
Molberg, J. M., Bottineau, N. Dak.
Nelson, R. F., Dayton Bluff, Star Route No. 2, St. Paul, Minn.
Rowson, L., 215 N. 3rd, Brainerd, Minn.
Usenik, F. A., Warroad, Minn.
West, W. E., Warroad, Minn.

Associate Grade

Bennett, H. D., Keep Minnesota Green Comm., St. Paul, Minn.

Washington Section

Member Grade

Quillinan, A. B., 3317-A Croffutt Place, S. E., Washington, D. C.

Wisconsin-Upper Michigan Section

Junior Grade

Decur, C. J., 412 First Ave., Wakefield, Mich.
Jordahl, H. C., 2806 Union, Madison 4, Wis.

Foreign

Corresponding Grade

Ito, Mitsugu, 1345 Toyoki-mure, Ibi-gun Gifu-ken, Japan

J. Lee Deen (1896-1951)

J. Lee Deen, Fort Collins, Colo., one of the well-known deans of professional forestry education in America, died suddenly on April 24 following an emergency operation. He was 54 years of age.

Born November 15, 1896 in Minneota, Minn. and christened Joshua Lee Deen, he attended St. Olaf College, where his education was interrupted by service in the Field Artillery during World War I. Later he entered the University of Minnesota, and in 1927 received the B.S. degree in forestry with distinction. Going on to Yale for graduate work, he was awarded the M.F. degree in 1929 and the Ph.D. degree in 1931. Dean Graves subsequently wrote of him as "one of the ablest of our graduates."

Following Lee's graduation from Yale he taught there for two years as instructor in silviculture, carrying the teaching work of the late Prof. James W. Toumey, whose graduate assistant he had been. In 1933 he was appointed to the faculty of the Department of Forestry of the Pennsylvania State College, where he remained five years, teaching silviculture and doing research in game management.

When in 1938 the president of Colorado A & M College was seeking a dean to head the Division (now School) of Forestry and Range Management he was impressed with Dr. Deen's record and, effective August of that year, appointed him to the deanship. Dr. Deen's nearly thirteen years at the college were fruitful ones. Despite reduced enrollments during the war years, the number of undergraduate degrees granted during his deanship (1939-1951) totals 386. Graduate degrees were awarded beginning with 1946, and these total 51.

During his tenure, both the admission qualifications to the school and the required scholarship standards were raised. In addition, increased emphasis was given to adjunctive courses to train men—and women—for all phases of wildland management. Departmentalized, the school now offers separate undergraduate curricula in forest management and utilization, in forest recreation and game management, and in grazing and range management, plus the master of forestry degree.

J. LEE DEEN

One of his special interests was the development of the summer forestry camp at Pingree Park, a beautiful 1600-acre tract in the Rocky Mountain high country up the Cache le Poudre River. In addition to cabins for faculty and students, there is a mess hall and a recreation and study hall. It is one of the fine summer camps of our forestry educational system.

Among his numerous assignments in professional education and in the Society of American Foresters were the following: chairman of the Society's Division of Education during 1948; member of the Society's Committee on Professional Standards and Committee on Postwar Education; chairman of the Central Rocky Mountain Section; and member of the Committee on Accrediting Schools of Forestry since 1949. In 1948 he was chairman of the professionally potent Council of Forestry School Executives.

Besides his office of dean of the School of Forestry and Range Management at Colorado, for a period of several years following World War II he was also dean of the college faculty. In this capacity he served as faculty chairman in dealing with administrative matters at the college.

During the spring of 1949 Dr. and Mrs. Deen made a trip to western Europe, visiting forestry schools and studying European forestry educational methods in the United Kingdom, France, Switzerland, Germany, and the Scandinavian countries. He was a constant student of all that had to do with professional education.

Over the past twenty years Dr. Deen has appeared frequently on programs of Section and national meetings of the Society of American Foresters. His articles have appeared in the JOURNAL OF FORESTRY, and in other scientific and professional periodicals. He was the author of *A Swedish-English Vocabulary for Foresters*, published by Yale University in 1935, and of *Silvical Characteristics of American Trees*, issued by Brownell Company in 1937.

Lee Deen is survived by his wife Ruth who makes her home at 1413 South College Avenue, Fort Collins, Colo. Funeral services were held in St. Luke's Episcopal Church in Fort Collins on April 28. His body was cremated and his ashes were interred in his beloved Pingree Park.

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Forestry News

Fontanna to Head Michigan School of Natural Resources

Stanley G. Fontanna, deputy director of the Michigan Department of Conservation, has been appointed professor of forestry and dean of the School of Natural Resources at the University of Michigan, effective July 1. The present dean, Samuel T. Dana, will voluntarily relinquish the post a year in advance of the start of his retirement furlough.

Dean Dana, who has held the position since 1927, will continue on the faculty after July 1 in a new professorship known as the Filibert Roth University professor of forestry. He will teach courses in forest history, policy, and economics and plans to complete a book on forest policy. His retirement furlough will start on July 1, 1952.

Born in Powers, Mich., February 5, 1894, Mr. Fontanna received a bachelor of science in forestry degree from the University of Michigan in 1917. He enlisted in the U. S. Army right after graduation and advanced to the rank of first lieutenant in the infantry. After leaving the Army in 1919, he was with a timber company in Idaho for a year, and from 1920 to 1925 was with the land department of the Ford Motor Company at Iron Mountain, Mich., where his work dealt chiefly with timber management and the procurement of wood supplies. He was a general manager of a Lansing (Mich.) retail lumber and building supplies firm from 1926 to 1929.

Mr. Fontanna joined the Michigan Department of Conservation in 1929, and was chief of the Lands Division until 1934 when he assumed his present post as deputy director. He has handled most of the actual administration of the department and has reorganized both the finance and personnel sections.

He has been active in a number of organizations concerned with forestry and conservation. From 1945 to 1947, he was chairman of the committee of consultants to the Forest Products Research Committee of the Michigan State Planning Commission. He has been a member of the Forest Products Research Advisory Committee of the Michigan College of Mining and Technology since 1947 and of the Forest Research Council for the Lower Peninsula of Michigan since 1949.

During 1946-1949, Mr. Fontanna was chairman of the joint committee

STANLEY G. FONTANNA

of the Society of American Foresters and the Charles Lathrop Pack Foundation which completed surveys of forestry administrations in nine states. He was chairman of the Central States Section of the Society of American Foresters in 1946-1947 after serving as vice chairman. He is at present a member of the Council of the Society. He was elected vice president of the Association of State Foresters in 1948 and was president during 1949.

Dean Dana will be the tenth member of the faculty to be honored with a University professorship since this type of distinction was established by the Board of Regents in 1947 to recognize distinguished achievement and reputation in the field of the holder's scholarly interest. This is the first University professorship in the field of forestry. His professorship has been named in honor of Filibert Roth who was chairman of the Department of Forestry in the University of Michigan from 1903 until 1923.

Nominations for Conservation Awards

A call for nominations of candidates for The American Forestry Association's conservation awards for 1951 has been issued by the association. Nominations will be accepted through July 15.

The five awards, to be presented during AFA's annual meeting this fall, will for the third consecutive year recognize individuals who have performed outstanding services in conservation of American soil, water, forests, and wildlife resources.

Recipients of the awards will be chosen by a six-man committee headed by Robert N. Hoskins of Norfolk, Va., industrial forester for the Seaboard Airline Railway.

Other members of the awards committee are Rep. Watkins M. Abbitt of Virginia, Milton M. Bryan of the U. S. Forest Service, Dr. M. D. Mobley, executive secretary of the American Vocational Association and a 1949 award winner; Fred Morrell, Washington representative of the American Paper and Pulp Association, and E. A. Norton, assistant to the chief of the United States Soil Conservation Service.

Candidates for the awards are sought particularly for their conservation work in the fields of news, public service, industry, radio, and education.

Individuals and organizations wishing to make nominations should send them to The American Forestry Association, 919 Seventeenth Street, N. W., Washington 6, D. C., marked for the attention of the Awards Committee.

Nominations should include information as to the candidate's achievements, testimonials, press clippings, endorsement, and seconds to the nomination. They should be confined to not more than 500 words and, when feasible, a five by seven inch glossy photograph should be enclosed.

Stone Named Regional Forester Of Pacific Northwest

J. Herbert Stone of Atlanta, Ga. has been appointed regional forester of the Pacific Northwest Region with headquarters in Portland, Oreg.

He fills the vacancy created by the recent death of Horace J. Andrews.

From 1936 to 1945 Mr. Stone directed timber management projects in the Forest Service's regional office in Milwaukee. There he served successively as assistant head of the Division of Timber Management, head of the Section of Private Forest Management, and director of a wartime timber production project.

Following his work in Milwaukee, Stone served for a short time as director of the Central State Forest and Range Experiment Station in Columbus, Ohio. He was then transferred to Atlanta as regional forester of the Southern Region. Mr. Stone entered the Forest Service on July 1, 1927.

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Connaughton Named Regional Forester

Charles A. Connaughton, director, Southern Forest Experiment Station, has been appointed regional forester of the Southern Region, U. S. Forest Service, Atlanta, Ga. to succeed J. Herbert Stone who has been transferred to the Pacific Northwest Region.

He is a native of Placerville, Idaho, and a graduate in forestry, 1928, from the University of Idaho. In 1934 he received a master's degree from Yale. Since 1928 he has been employed by the U. S. Forest Service in a variety of positions in forest research and national forest administration. Since 1944 he has been director of the Southern Forest Experiment Station, New Orleans, La.

Saratoga Experimental Gardens

On January 1, 1951 Saratoga Experimental Gardens, Saratoga, Calif. was founded and established by Ray D. Hartman, horticulturist and owner of The Leonard Coates Nurseries, Inc. of San Jose. Director of the experimental gardens is Maunsell Van Rensselaer, for the past 16 years director of the Santa Barbara Botanic Garden.

The chief field of interest of the experimental garden will be in western shade trees and native California ornamental shrubs. For the next few years emphasis will be placed on the selection and propagation of the best available strains of shade trees and shrubs, with studies in methods of propagating superior plant stock on a large scale. Plant breeding work is contemplated for the future.

Bottomland Hardwoods Adviser Named by U. S. Forest Service

John A. Putnam, Stoneville, Miss. has been appointed regional consultant and advisor on bottomland hardwoods for the Southern Region, U. S. Forest Service.

Putnam will continue in charge of the Delta branch of the Southern Forest Experiment Station at Stoneville, but will spend half his time with the division of state and private forestry. He will work closely with southern state forestry organizations in providing advice and consultation to private landowners who wish to manage bottomland hardwoods for continuous yields. In addition he will assist forest supervisors in formulating management plans for national forests.

New Hampshire Forest Survey

To achieve a balance of saw-timber growth with saw-timber drain in New Hampshire, loggers would have to cut more hardwood trees and fewer softwood trees, according to the U. S. Forest Service.

A report released by the Northeastern Forest Experiment Station, Upper Darby, Pa., states that drain of New Hampshire softwood saw timber exceeds growth by 34 percent, while only 23 percent of the hardwood sawtimber growth is being utilized. The publication, *Forest Statistics for New Hampshire*, is one of a series of state statistical reports giving results of the nationwide Forest Survey.

The New Hampshire survey reveals that 81 percent of the land in the state can be classified as commercial forest land.

Only 12 percent of this forest land, however, has saw-timber stands exceeding 5,000 board feet per acre. Twenty-six percent has saw-timber stands ranging from 1,500 to 5,000 board feet per acre. The remaining 62 percent is so sparsely stocked that saw-timber volume averages less than 1,500 board feet per acre.

The commercial forest area of New Hampshire is 4,682,000 acres. Hardwoods predominate on 58 percent. White pine forests occupy only 16 percent. Eighty-five percent of the commercial forest area is privately owned.

The total volume of saw timber in New Hampshire is 9.7 billion board feet. Of this, 4.4 billion is in sawtimber stands having more than 5,000 board feet per acre, 3.8 billion in light saw-timber stands and the remaining 1.5 billion in trees scattered in poletimber, seedling and sapling stands.

The total volume of all timber in trees 5 inches in diameter and larger, including saw timber, is 64.8 million cords.

New England Fire Conference

The annual Forest Fire Conference, sponsored by the Fire Control Committee, New England Section, Society of American Foresters, will be held at the University of New Hampshire, Durham, June 19 and 20.

The conference starts on the evening of June 19 with a supper at the Durham Community Hall, followed by a meeting of the Strafford County Fire Wardens' Association. On June 20 demonstrations will be held at Bear Brook State Park. George F. Richardson, Jr. is chairman of the Section's fire control committee and is in charge of the program.

New Forest Survey of Alabama

A comprehensive reinventory is being made of the forests and forest industries of Alabama.

The survey, second in Alabama's history, will be made by the Southern Forest Experiment Station, U. S. Forest Service in cooperation with the Forestry Division of the Alabama Department of Conservation. The Tennessee Valley Authority will aid in surveying the areas in its territory. The first forest survey of Alabama was made in 1935-36.

Guided by aerial photos, they will measure the trees on quarter-acre plots located at 3-mile intervals throughout the State. On each plot they will identify three "witness trees," so that the plot can be located and remeasured in future surveys.

The survey will also include studies of the amount and kind of wood used by industries and of the rate at which wood is being used. Special studies, including forest landownership, will also be carried out. If funds permit, the survey will be completed in the fall of 1952. Similar surveys have recently been made of Mississippi, Arkansas, and Tennessee.

Positions Wanted

Western forester, B.S.F. 1940, age 33, married, 2 children; good health; experience since 1937 includes 5 seasons U. S. Forest Service; scaling for lumber companies in California pine and redwood; recent experience Soil Conservation Service management plans in timber area. Supervisory capacity, proven ability to handle responsibility, experienced in public relations and office management. Desires position or association with consulting firm, or an opportunity for responsible position with progressive lumber company. References and details upon request to
Box T, Journal of Forestry, Mills Building, Washington 6, D. C.

Forestry graduate, 33 years old, married; 9 years in woodland management, timber sales, and administration; experience in sawmilling and logging operations; 4 years research in thinning young pine plantations and natural stands for post and pulpwood. Best of references.
Box V, Journal of Forestry, Mills Building, Washington, D. C.

Forester, 44, married, 3 children, 18 years' experience with U. S. Forest Service, Soil Conservation, and Extension Service in Rocky Mountain States, Lake States, and Central States, cruising, timber marking, planting, protection, and administration. Desires permanent position with private forestry organization. Timber management main interest. References and detailed information on request.
Albert L. Morley, Extension Service, Oklahoma A & M College, Stillwater, Okla.

Graduate forester, 25, B.S.F., desires permanent position with forest-owning or wood utilizing firm in the Northeast. Interest in research or technology. Has good technical background. Detailed information on request.
Box W, Journal of Forestry, Mills Building, Washington 6, D. C.

Nurseryman and forester 51, from northern state desires permanent position managing forest tree nursery in southern state. 25 years experience farm forestry and nursery management. Member SAF. Details on request.
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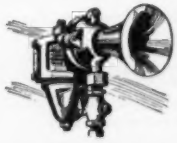

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AFPI Adds Second Man in West

American Forest Products Industries has appointed Richard C. Gearhart, formerly with the Michigan Department of Conservation, to manage its western regional office. An Oregonian by birth, Mr. Gearhart will maintain headquarters in Portland. His territory includes the 11 western states.

Harold Olson, AFPI's only representative in the area for the past seven years, becomes chief of AFPI's western news bureau. A former Aberdeen, Wash., newspaperman, Mr. Olson now will devote full time to editorial activities.

Prior to his appointment by American Forest Products Industries, Mr. Gearhart served as assistant chief of the Division of Education in the Michigan Department of Conservation. He is a graduate of the University of Michigan forestry school and, except for World War II duty as a naval aviator, has been with the Conservation Department of that state since 1935.

Mr. Gearhart is a member of the Society of American Foresters. He was elected president of the National Association of Conservation Education and Publicity in 1950.

Portland will continue to serve as headquarters for AFPI's western division.

Duncan McDuffie, Redwoods Leader, Dies

Duncan McDuffie, widely known conservationist and civic leader, died in Berkeley, Calif. April 21. He had served as president of the Save-the-Redwoods League since 1944. He had been director of the league since 1925, and pioneered in the development of the California State Park System. He was chairman of the California State Parks Council, the organization coordinating the efforts of all groups which successfully campaigned for the State Park Bonds, which were approved by a majority of almost three to one by the voters of the state in November, 1928.

Duncan McDuffie served as president of the Sierra Club in 1929-31, and again in 1943-45. He was awarded the Cornelius Amory Pugsley Medal by the American Scenic and Historic Preservation Society for distinguished service in the field of state parks. A champion of the national parks, he was a close friend of Stephen T. Mather, first director of the National Park Service, and the succeeding directors, including Horace M. Albright and Newton B. Drury, of California. Duncan McDuffie was chairman of the Yosemite Advisory Board, on which he rendered invaluable service for many years.

He was graduated from the University of California in 1899, and in 1950 received from his Alma Mater the honorary degree of LL.D, in recognition of his outstanding contributions to park conservation and civic leadership.

He was active in development of residential subdivisions since 1905, as president of the real estate firm of Mason-McDuffie Company. He was chairman of the Civic Arts Commission, Berkeley, 1913-17.

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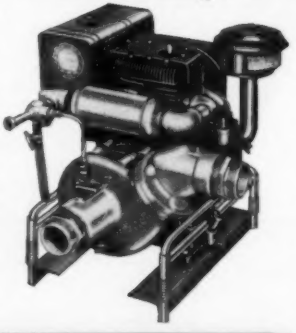

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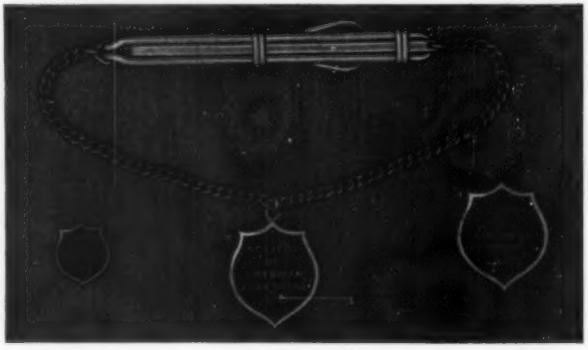

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Gregg Named Chief, Parks Interpretive Branch

H. Raymond Gregg, chief of the naturalist branch, National Capital Parks, has been named chief of the interpretive branch, Natural History Division of the National Park Service. W. Drew Chick, Jr., succeeds Gregg and Carlos Kenny Dale has been named to succeed Chick as assistant chief.

Gregg is one of the foremost naturalists in the Park Service. In his new work he will devote attention to research of the natural history in National Park Service areas, and coordinate and improve interpretive services for visitors to these areas.

Gregg entered the Park Service in 1933 as a park naturalist in Hot Springs National Park, Arkansas. In 1936, he transferred to Rocky Mountain National Park, Colorado, and while there became nationally known through his "Nature Sketches" program which was broadcast over a nationwide radio network during the summer months. After serving for approximately 11 years at Rocky Mountain, he transferred to Washington, D. C., to direct naturalist activities in the National Capital Parks.

Mr. Chick has been assistant chief of the branch since 1943. A native of San Francisco, he began working for the National Park Service as a park ranger in Sequoia National Park, California, in 1934. He also was assigned to Zion and Bryce Canyon National Parks, Utah, as junior forester and ranger naturalist. In 1936, he transferred to Shenandoah National Park, Virginia, serving as district park ranger and acting park naturalist until 1943, when he transferred to the Office of National Capital Parks.

Carlos Kenny Dale, named to succeed Chick as assistant chief of the Naturalist Branch, has been a naturalist in the office since 1948. From 1940 to 1948, with the exception of a tour of duty in the Coast Guard during World War II and a year at college, he served as a park warden and later as a park ranger on the Blue Ridge Parkway, Virginia-North Carolina. Prior to entering National Park Service work, Dale worked for the Division of Parks in Richmond, Virginia, and the Department of Parks and Forests, Norfolk, Virginia. He is a native of Norfolk, and has a B.S. degree in forestry from North Carolina State College and an M.S. degree in biology from Virginia Polytechnic Institute.

Lumber Manufacturers Announce Award Winners

Scholarship awards of $400 each have been granted to the nation's four outstanding forestry school students majoring in wood utilization. In announcing the winners, R. A. Colgan, executive vice president of National Lumber Manufacturers Association, sent telegrams of congratulations to the four students and the deans of their respective schools.

The award winners, who will receive 10 weeks of summer training in the Timber Engineering Company Research Laboratory, Washington, D. C. are: John Zerbe, Pennsylvania State College; Aldos Barefoot, University of North Carolina; Dan Remington, University of Minnesota; and Richard Pentoney, New York State College of Forestry.

These men, selected from a group of ten nominees, were chosen on the basis of individual and scholastic achievements as well as the recommendations of the deans or department heads of participating colleges and universities.

Following the initial pattern set last year, when four other men were awarded scholarships, Mr. Colgan said the association will do what it can to assist these men in obtaining employment in the lumber industry. He explained that the purpose of these yearly scholarships is to encourage more technically minded forestry school students to prepare themselves for growing opportunities in private wood industries.

Timber Engineering Company, which is affiliated with the National Lumber Manufacturers Association, operates a modern and well-equipped research laboratory in Washington, D. C. Its field is exclusively forest products, in which opportunties wait to interest the talents of the students.

Forest Service Spends $575,682 on Range Improvements

The U. S. Forest Service spent $575,682 during fiscal year 1950 for the construction of range fences, livestock driveways, and livestock watering places on national forests.

Walt L. Dutton, chief of the Forest Service's Division of Range Management, stated that this expenditure built 584 miles of range fences, 48 miles of livestock driveways, and 558 water developments. This brings the total construction range improvement work of the Forest Service to more than 27,000 miles of fences, 3,500 miles of driveways, and 16,000 water developments in good repair. Values of those now in use, including the 1950 improvements, are close to $16,500,000.

These figures do not include the construction carried on through the years by the stockmen's associations. These neighborhood groups, which number approximately 800, annually vote on maintenance of certain improvements, assessing members according to size of their herds.

Additional amounts were spent on range reseeding and eradication of poisonous plants. In 1950 the Forest Service reseeded 62,986 acres of range land at a total cost of $680,400. Since the revegetation program has been in effect, the Forest Service has seeded 333,650 acres at a cumulative cost of $2,466,841. This averages approximately $7.40 an acre.

Future plans for range improvement and revegetation call for the reseeding of about 4,000,000 acres of range land; construction of 30,000 miles of fence, 23,000 range water developments, 9,500 miles of stock driveways; and control of poisonous and undesirable plants on 439,000 acres of range and of rodents on 15,000,000 acres. This program will be carried out as funds become available.

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FOREST RESEARCH COUNCIL FORMS IN LOWER MICHIGAN—Growing interest in forest research in Lower Michigan was recently demonstrated by the formation of a Forest Research Council for the Lower Peninsula. This council is an outgrowth of a committee organized two years ago by the Lake States Forest Experiment Station to serve as an advisory council to the Lower Peninsula Forest Research Center at East Lansing.

The reorganized Lower Peninsula Forest Research Council will now act in an advisory capacity to all agencies conducting forest research and will attempt to coordinate all forest research activities in Lower Michigan. The council will have a permanent executive secretary and a rotating chairman.

E. L. Demmon, director of the Lake States Forest Experiment Station, was elected chairman for the annual meeting in Ann Arbor, March 21. John L. Arend, forester in charge of the Lower Peninsula Forest Research Center, was named permanent secretary. Chairman of the council for the current year is S. T. Dana, dean of the School of Natural Resources at Ann Arbor.

Shown above are members of the council and other foresters attending the meeting in Ann Arbor, March 21: *Back row.*—G. D. Blair, G. S. McIntire, John Hansen, W. C. Finley, A. J. Panshin, T. D. Stevens, John Hawkins, R. N. Cunningham, Frank Monroe, Walter Koepp, L. G. Engle, T. E. Daw, T. M. Kataja, U. M. Martilla, Paul Newcomb, N. C. Cook, R. S. Cochran. *Front row.*—P. A. Herbert, L. W. Gysel, S. T. Dana, E. L. Demmon, John Arend, K. P. Davis, F. H. Eyre, W. F. Ramsdell, L. C. Palmer.

Seattle Gives Pines to Japan

As a gift of the people of Seattle and the Japanese Trade Fair to the people of Japan, 1,600 ponderosa pine trees are to be planted in the soil of 46 Japanese cities and prefectures.

The gift grew out of an initial presentation of fifty Douglas-firs which the people of Seattle, as a memorial to the State of Washington Japanese Trade Fair, sent to Japan a few weeks ago for planting in one of Tokyo's public parks. A native totem pole, given through the courtesy of Alaska Steamship Company of Seattle, was also sent to Japan and will be part of the Japanese Trade Fair memorial.

Officials of the Japanese Trade Fair asked at that time if other Japanese cities would like native Washington trees for planting in their own public parks. The reaction from Japan was spontaneous, and the present shipment is the result.

The 1,600 trees were donated by the University of Washington College of Forestry. The trees came from the university's experimental forestry station at Pack Forest near La Grande.

In a return gesture for the trees being sent from Seattle, the people of Japan have offered seedlings of Japanese pine to Seattle.

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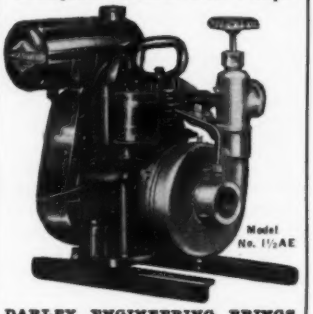

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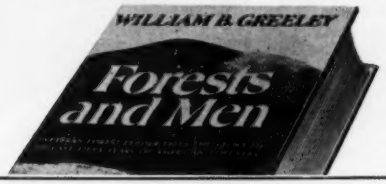

THIS fascinating, factual history spans the years from the days of migratory lumbering to the present, and recounts the events which led to the rescue of America's woodlands and the development of a new, democratic system of forestry. Here are some sampling from the book:

"Gifford Pinchot and I looked at the economic side of the forest picture through different glasses. He saw an industry so blindly wedded to fast and destructive exploitation that it would not change. I saw a forestry economy overburdened with cheap raw material. Mr. Pinchot saw a willful industry. I saw a sick industry."

"One wise old logger said that plenty of trees would be grown when they were an insurable fire risk and you paid only a fair tax on what you got for the crop."

"The steady expansion in wood uses and technologies is the strongest ally of forestry in the U. S."

These are but a small foretaste of the book whose every page has something authoritative and fascinating to say to everyone whose livelihood or interest is forestry or the industries. The author was Chief of the U. S. Forest Service for eight years. Since 1928 he has been Secretary of the West Coast Lumbermen's Association and he is now the Chairman of the Board of the American Forest Products Industries. One of the foremost authorities on the subject, he is respected and known both by government foresters and leaders of industrial forestry.

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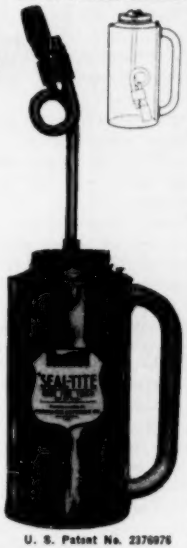

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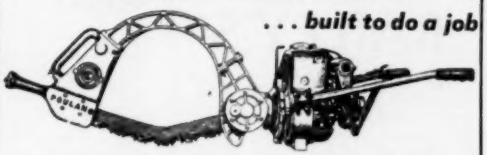

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Storey Heads Influences Work At Northeastern Station

Herbert C. Storey has been appointed chief of a new Division of Forest Influences at the Northeastern Forest Experiment Station, Upper Darby, Pa.

Watershed-management research activities of the station, including those carried on in cooperation with states and other agencies, have been increasing steadily. Director V. L. Harper announced that the new division was set up to better provide for over-all direction, supervision, and coordination of these activities.

Although the station's major program in forest-influences research is carried on at its Delaware Basin Research Center in Pennsylvania and its Mountain State Research Center in West Virginia, some studies in forest influences are in progress at nearly all the station's research centers.

Mr. Storey, a native of California, was graduated in 1932 from Stanford University, where he majored in groundwater geology. He joined the California Forest and Range Experiment Station of the Forest Service in 1933. There he specialized in forest influences work, with headquarters at the San Dimas Experimental Forest, Glendora, Calif.

At San Dimas he assisted in developing watershed studies in Southern California and had a varied experience in forest influences and hydrologic work. He is co-inventor of the San Dimas Flume for measuring debris-laden streamflow. He assisted in establishing the flood-control program on the Los Angeles River and in planning watershed studies in the Sierra Nevada. During the war he served with the U. S. Marine Corps.

Mr. Storey transferred to the Northeastern Station in 1948, as leader of the station's Delaware Basin Research Center, where he supervised installation of watershed studies in the Delaware Basin.

Fagergren, Assistant at Mesa Verde Park

Fred C. Fagergren has been named assistant superintendent of Mesa Verde National Park, Colorado. He had been chief park ranger at Zion and Bryce Canyon National Parks, Utah, since 1943, a position he attained after working for a number of years in these two parks, first as a temporary park ranger, then as a permanent member of the ranger staff. He is a native of Salt Lake City, and a member of the Society of American Foresters, as well as a charter associate member of the Wildlife Society.

Weather Improvement Legislation

The National Weather Improvement Association has drawn up a model state Weather Modification Control Act for the guidance of all who are interested in establishing a uniform, constructive legislative pattern in the different states which will safeguard public welfare and at the same time permit the science of weather control to develop freely. The bill recently passed the Colorado legislature without a dissenting vote. Copies are available from the association, 202 Elizabeth St., Fort Collins, Colo.

Escuela Agricola Panamericana

The Story of the Escuela Agricola Panamericana is the title of a 36-page report on the Pan American School of Agriculture, founded and financed by the United Fruit Company to train Central American youth in good agricultural practices. Founded in 1941, and located in the valley of the Rio Yeguare, southeast of Tegucigalpa, the capital of Honduras, the school property consists of some 3,500 acres. Students are trained in all phases of agriculture, including the care of woodlands.

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Forest Recreation Use At All-time High

Recreational use of national forests reached an all-time high in 1950, when 27,367,800 visits were made to lands administered by the U. S. Forest Service.

This record is 5 percent greater than the visits recorded in 1949 and 52 percent greater than the visits of 1941, the highest prewar year, according to John H. Sieker, chief of the Forest Service's Division on Recreation and Lands. He said that people seeking recreation spent 38,932,100 man-days on national forests during 1950.

Nearly half the recreationists using national forests stayed at camp and picnic grounds, winter sports areas, and organization camps. This use of national forests accounted for 13,061,300 visits during 1950.

Hikers, horseback riders, hunters, fishermen, mountain climbers, cross country skiers, and others made 11,443,600 visits to parts of national forests where special improvements are not needed.

There were 2,862,900 visits to resorts, summer homes, and organization camps that have been developed on national forests by private capital under special use permits.

The Forest Service estimates that 56,000,000 motorists drove over highways and roads in national forests last year. Since these sightseers went primarily to enjoy the forest scenery and did not stay at recreational areas, they are not counted officially as forest users.

Total recreational use of the 152 national forests during 1950 is broken down as follows according to the primary purpose of the visit:

General enjoyment of forest, 7,963,600 visits; picnicking, 6,326,500; fishing, 4,885,300; hunting, 2,284,600; camping, 1,534,100; winter sports, 1,516,600; swimming, 902,200; hiking and riding, 634,600; organization camping, 407,400; gathering forest products for pleasure, 334,000; canoeing, 116,500; scientific study and hobbies, 101,400; wilderness travel, 91,600; and other miscellaneous activities, 264,400.

Unnecessary Destruction Prohibited by New Coal Leases

Restoration of the surface of lands and reasonable steps to prevent water pollution are required of producers who take coal from public lands under the provisions of a revised lease form and amended regulations which were approved by the Secretary of the Interior on March 27.

Several other changes have been made in the regulations providing for the leasing of coal from public lands, as well as certain changes in the lease form. These changes, in general, will reduce paper work and exchange of correspondence—thereby contributing to efficiency in the handling of leases.

One other major provision in the amended regulations provides for a limitation on overriding royalties.

Littlehales Receives Japanese Honors

First Lieutenant Edward F. Littlehales, Medical Service Corps, Registrar of the 382nd General Hospital which is part of the Southwestern Command Headquarters at Osaka, Japan, recently visited the Forestry Division of General Headquarters in Tokyo. He was guest of honor at a field day sponsored by the Honshu Paper Company, largest pulp manufacturers in Japan.

Lieutenant Littlehales is on military leave of absence from the U. S. Forest Service, Division of Forest Economics, Washington, D. C.

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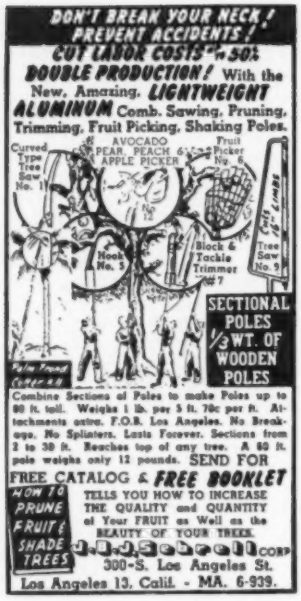
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Tree Planting Demonstrations Conducted at 21 Schools

Twenty-one schools in 18 counties have completed planting 43,000 pine seedlings, according to W. J. Barker, leader, Clemson Forestry Extension Work.

The purpose of these plantings was to give young people experience and to create an interest in tree planting; to establish demonstrations in forestry convenient to the schools; and to provide income through the sale of thinnings.

The plantings were a cooperative project with the Clemson Extension Service and the State Commission of Forestry working with the schools and the pulp industry including the International Paper Company, West Virginia Pulp and Paper Company, Champion Paper and Fibre Company, and the Union Bag and Paper Company. Approximately 460 persons took part in the actual plantings of the seedlings.

This project was started in the fall of 1948. Since the start 84 schools and one church have planted a total of 171,500 seedlings in 36 counties.

"In most cases the schools obtained 20-year leases on the areas where the trees were planted," Mr. Barker said. "All cuttings will be made under the supervision of the cooperating agencies, and the proceeds from the sale of the thinnings will be spent for the school improvements which will be of benefit to all. At the end of the lease period the land and the remaining stand of trees will be returned to the original owners."

Texas Appoints Forestry Educator

Howard E. Weaver has been appointed assistant forestry educator for the Texas Forest Service. He replaces Everett Evans, who accepted an editorial position with the Steck Company last fall. As school specialist, Weaver will cooperate in the resource-use education program in Texas schools and will serve as forestry consultant in teacher workshops.

Prior to his employment by the Texas Forest Service, Weaver had been with a New York publishing company, and had served three years with the armed forces. He holds a bachelor's degree in forestry, a master's degree in education, and will receive his Ph.D. degree in conservation education from Cornell University in June.

Whitman Supervisor Retires

Charles D. Simpson, supervisor of the Whitman National Forest, Baker, Oreg., retired February 28, after nearly 40 years of work with the U. S. Forest Service.

Simpson is a native of Minnesota and a graduate of the University of Minnesota, in 1913. He entered the Forest Service on the Superior National Forest in 1911 and received his first civil service appointment in 1913 on the Minidoka forest in Idaho. He was promoted to supervisor of the Caribou forest in Idaho in 1917, and in 1919 was transferred to the regional office at Ogden, Utah. He served as supervisor of the Lolo forest in Montana from 1923 to 1930, and as supervisor of the Coeur d'Alene forest in Idaho from 1930 until he was transferred to Baker in 1935.

Simpson has been an outstanding Boy Scout leader in the Blue Mountain Boy Scout Council. In 1949 he received the Silver Beaver Scout Award, and last year was elected president of this council, which comprises 13 counties in eastern Oregon and Washington. He is past-president of the Baker Rotary Club, and a member of the Society of American Foresters, the Masonic Lodge, and the Chamber of Commerce in Baker.

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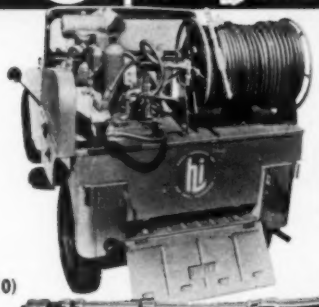

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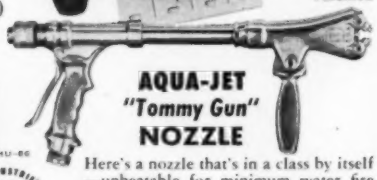
• Fits the CJ-3A Universal Jeep

Fully Patented



AQUA-JET "Tommy Gun" NOZZLE

Here's a nozzle that's in a class by itself—unbeatable for minimum water fire extinguishment. Impinging jets develop wide mist-like fan without wasting pump pressure. Instant change from stream to fog plus any shape in between.

Write for Prices and Specifications

HURST Super Booster

HU-60 HURST INDUSTRIES INC. SAN JOSE - CALIFORNIA

HURST INDUSTRIES, INC.
Subsidiary, CARDOX CORPORATION, Chicago, Illinois
San Jose, California

Tomorrow's pulp and paper depend on TODAY'S trees

WHEN A WORM LIKE THIS

CAN TURN

TIMBERLANDS

LIKE THIS

INTO

DESOLATE FIRE HAZARDS LIKE THIS

CONTROL LIKE THIS IS NEEDED

Let's save our priceless timber stands

Latest available figures tell us that there are over 2,267,000 acres of budworm-infested timberland in Washington and Oregon alone. A 267,000-acre spraying operation in 1949 with Penco forest spray showed a 97% budworm mortality. We are glad to join with other interests, as well as state and federal authorities, in this fight to conserve our natural resources. Support from every quarter will be helpful, for the battle may be a long one.

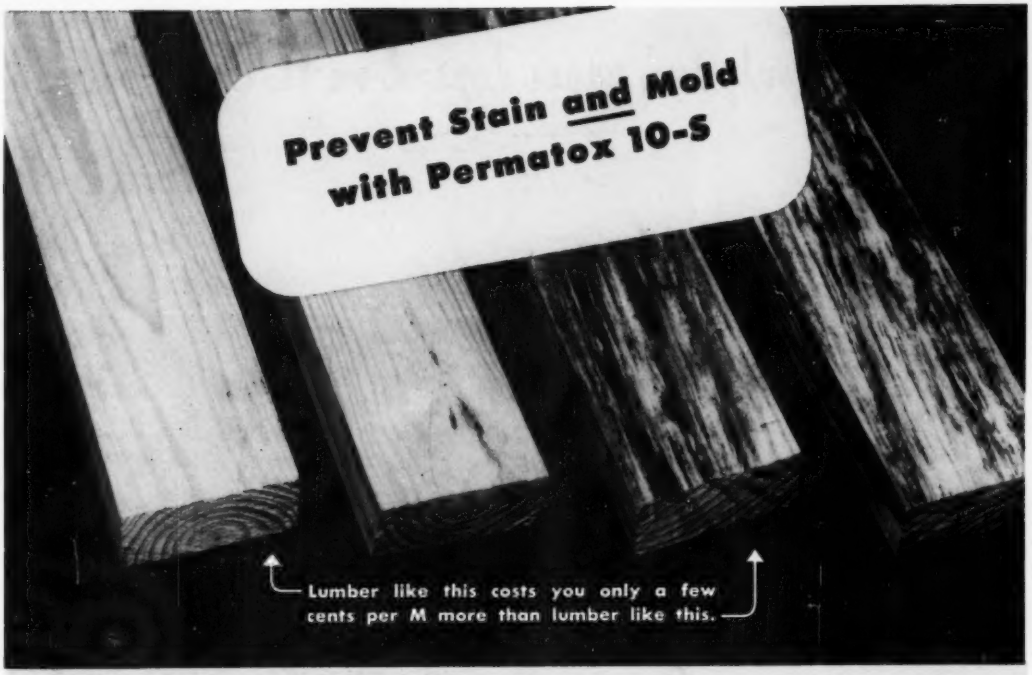
In the West: Pennsylvania Salt Manufacturing Company of Washington . . . Tacoma, Washington; Portland, Oregon; Berkeley and Los Angeles, California. In the East: Pennsylvania Salt Manufacturing Company, Philadelphia 7, Pa.

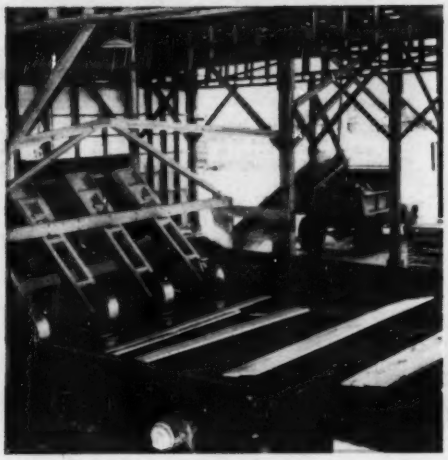
Liquid Chlorine • Caustic Soda • Bleaching Powder • Potassium Chlorate • Sodium Chlorate • Anhydrous Ammonia • Perchloron® • Sodium Arsenite • Sodium Hypochlorite—DDT • Penco forest spray • Weed Killers.

PENN SALT

chemicals

Progressive Chemistry for over a Century





A mechanical dipping vat, as shown here, is the usual method of applying Permatox 10-S. Lumber can also be sprayed or dipped in bulk. At small mills dipping can be done by hand. Consult us for specific recommendations.

■ PERMATOX 10-S was developed by Chapman Chemical Company for controlling stain, mold and decay in lumber during air seasoning. Treatment costs only a few cents per thousand. Dipping equipment is inexpensive and easy to build . . . and very little labor is required in treating. PERMATOX 10-S is equally effective on softwoods and hardwoods.

Large mills, concentration yards and small mills throughout the United States and Canada have used this effective treatment for years. Users say their bright lumber, treated with PERMATOX 10-S, brings higher prices . . . eliminates complaints due to stain and mold.

In addition to preventing sap stain, mold and decay, PERMATOX 10-S mixed with Chapman AMBROCIDE protects lumber against the attack of ambrosia beetles and other insects.

Write for literature—New Bulletin 51-S contains many helpful suggestions on preventing stain, mold and insect attack in lumber and logs.

CHAPMAN CHEMICAL COMPANY
333 No. Michigan Ave., Chicago 1, Illinois
Terminal Sales Bldg., Portland 5, Oregon
DERMON BUILDING, MEMPHIS 3, TENN.

CHAPMAN™ **PERMATOX® 10-S**

Prevents both sap stain and mold
in freshly cut hardwoods and softwoods

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COMMERCIAL CHEMICALS, LTD., Vancouver, B. C.